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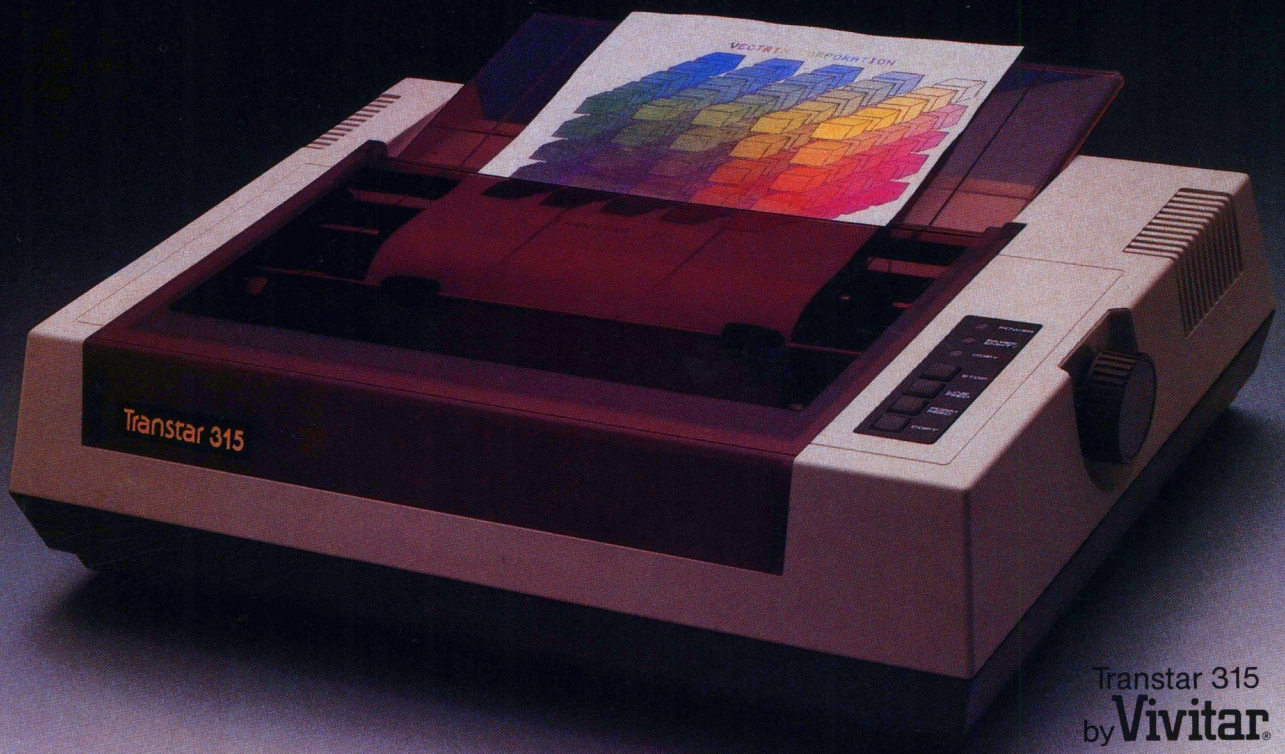

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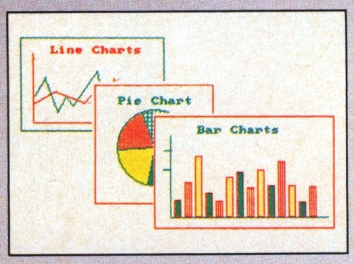

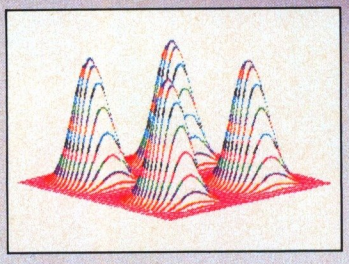

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Volume 7, Number 9

Features

6 Darwin's Apple
Keith Stattenfield
Simulating evolution and natural selection

8 Apple of Steel
Alton Loe
High tech helping heavy metal

10 LIFE—In the Fast Lane
Sam Vass & Sam Strickland
Cell patterns growing and dying on your screen at lightning speed

16 Speakalarms
Tim Kendrick
Combining a speech synthesizer and clock card to make a talking alarm clock/calendar

20 Call Your Apple
Clay Ruth
Creating an Apple-based telephone answering system

23 Speech Writer Enhancements
Clay Ruth
Improvements on a previously-published Mockingboard speech program

Reviews

30 Hi-Res Architectural Design
Lee Webster
Software for planning your dream home

32 Crypt of Medea
Larry Neibauer
More thrilling than a Saturday matinee

34 Simulated Computer
Lee Webster
Learn what's really happening inside your computer

45 RobotWar—Review and Challenge
Jeff Sandys
Programming your own electronic champion

Random Access

46 Something Over 32 Bits
Dave Redhed
Focusing on Mac and Lisa

48 ProDOS Profiles
Ken Kashmarek
Inside info from a ProDOS pro

The INNER

Don Elman

What Can't an Apple Do?

Since the introduction of affordable personal computers seven years ago, countless Apple users have adapted their machines to their own special needs. Most applications, of course, fall into the usual categories—word processing, data management, financial calculations, graphics, and education. Yet, one of the most powerful aspects of a "general purpose" computer is its capability of being employed in unusual ways that the original designers never imagined.

Many of these special applications can be accomplished with customized software; others may require specially-built hardware adaptations or interfaces. Our cover design this month suggests that non-common uses of Apples range from the lofty (space exploration) to the mundane (agriculture and industry), and from the life-sustaining (prosthetic devices) to the life-enhancing (health support). Within the bounds of human ingenuity, there appears to be no limit to the ways in which microcomputers can be used to improve our lives.

In This Issue

Our feature articles this month are selected to bring you a small but varied sample of unusual applications. **Darwin's**

ADVERTISER INDEX

Access Micro 22
Alpha Logic Business Systems 25
A.P.P.L.E. 57
Axlon 61
Baudville 3
Beagle Bros 17
Black Sun 39
Bytes & Pieces 44
CompuShows 9, 19
ComputerEase 26
Condicom 51
David Data 27
Digital Vision 41
Dimensional Disks 53
Douglas Electronics 11
Encore Ribbon Services 23
FlowerSoft 55
Golden Delicious Software 47
Human Forms 59
Interactive Microware 45
Laing Electronics 31, 49
Micron Technology 13
Mycroft-Soft Software 35
Name•Brand Software 43
Penguin Software 64
Prof. Jones 33
Quorum International 28
Softyme 7
Southeastern Software 15
Star Logic 29
Street Electronics 63
Technology One 14
Telephone Software Connection 62
The Computer Teacher 34
Third Wave Technology 54
Trac Systems 21
VF Associates 60
Winslow Sales 2

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Apple describes an ambitious science class project that attempts to simulate the process of evolution. **Apple of Steel** tells how an Apple performs a crucial production step at a steel foundry. **LIFE—In the Fast Lane** presents a new, extra-fast version of a program that displays the growth and death of living cell patterns. Two articles give instructions for unique applications of your Apple at home or office. **Speakalarms** tells how to make a talking alarm clock and calendar. **Call Your Apple** describes how to put together a computerized telephone answering system.

In our education section we have an overview of the many Apple uses at a secondary school (**Microcomputing at Minuteman Tech**), a description of how computers have enriched a special child's life (**An Apple Helps Rodney**), and a useful program for teachers of young children (**Low-Res Drawing on the Apple**). Rounding out the issue are software reviews, facts about Mac/Lisa and ProDOS, and our usual informative departments.

From our point of view, there is no end in sight to the types of special applications that are possible with an Apple. The only thing we're **sure** about is that—despite its name—you can't eat one . . . but who knows what tomorrow will bring!

Education

38 Microcomputing at Minuteman Tech
Earle D. Hancock
Unlimited uses for Apples at a vocational high school

40 An Apple Helps Rodney
Sheryl Blix
Adapting an Apple for a very special boy

42 Low-Res Drawing on the Apple—A Utility for Teachers
John C. Russ & Helen M. Adams
Using simplified graphics to teach children about computers

Letters

50 A.P.P.L.E. Doctor
Bruce F. Field
Superb silicon surgery

52 Write -A.P.P.L.E.
Reader's Forum

54 Publisher's Letter
Gary Kruger

Departments

55 Member Billboard
Kaiulani Schuler
Club notes

56 A.P.P.L.E. Member Services

57 A.P.P.L.E. New Products
Several excellent items for Macintosh and Apple II

58 The Marketplace
News and product announcements

63 Unclassifieds

Next Month

PASCAL

Call-A.P.P.L.E.

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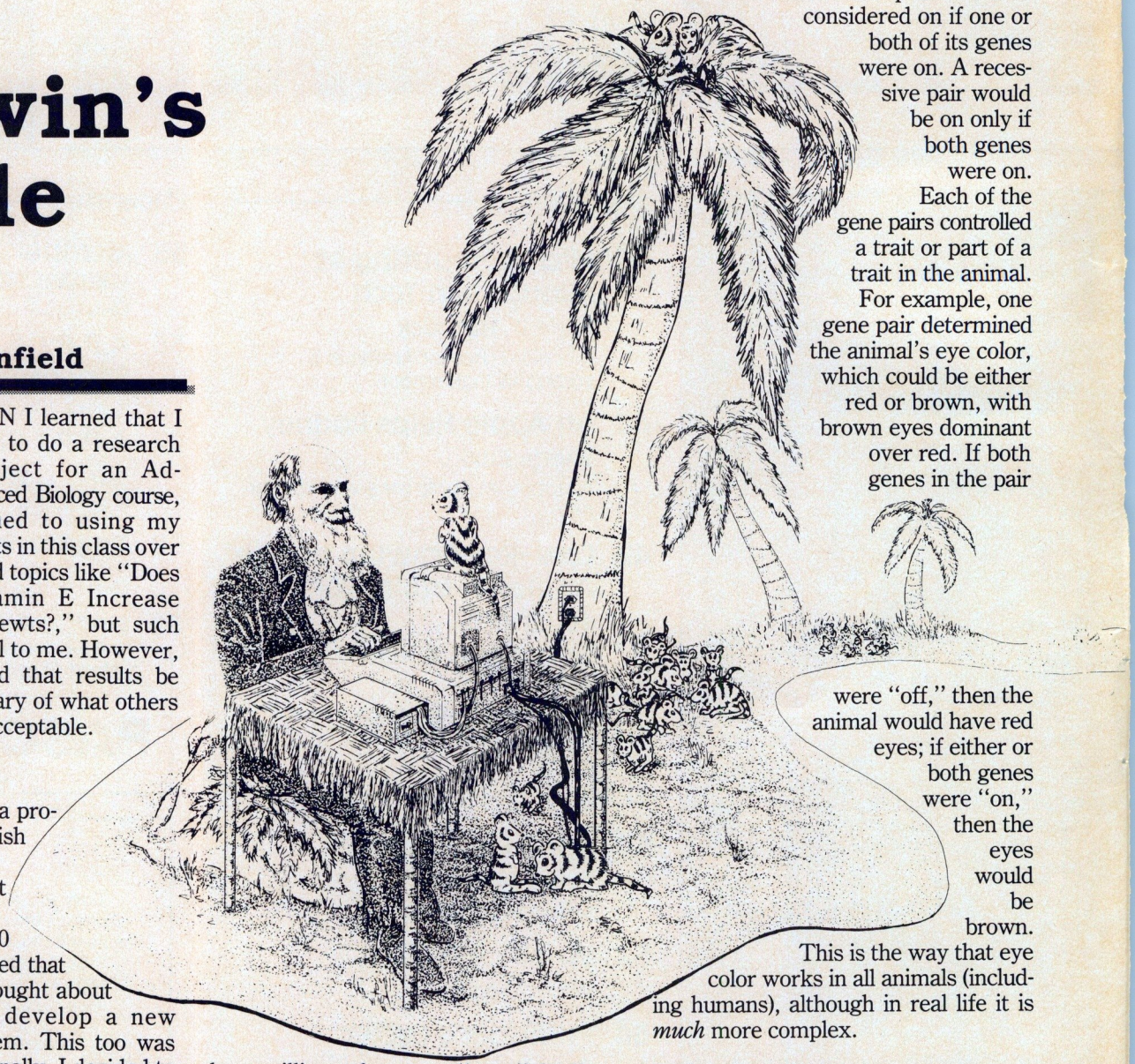
Darwin's Apple

Keith Stattenfield

WHEN I learned that I had to do a research project for an Advanced Biology course, my thoughts turned to using my Apple. Most students in this class over the years had picked topics like "Does an Excess of Vitamin E Increase Regeneration in Newts?," but such things did not appeal to me. However, the project required that results be measured—a summary of what others had done was not acceptable.



Birth of an Idea

I wanted to find a project I could accomplish on the computer. First I thought about getting my trusty II to find pi to 10,000 digits— but abandoned that idea fast. Next, I thought about how to get it to develop a new mathematical theorem. This too was quickly discarded. Finally, I decided to computerize the theory of evolution, the idea that living things change to adapt to their environment as time passes. Charles Darwin first presented this theory in the mid 1800's, but people still argue about its validity. I thought of a way to illustrate it by simulating the life of a hypothetical type of creature over long periods of time, preserving the genetic structure of each animal, and keeping statistics about each generation. Then it would be possible to determine whether the species was improving.

The Creature's "Alive"

Since even the simplest bacteria have millions of genes, a "pure" duplication of life would be impossible on the Apple. Instead, I "created" a small rodent, much like a hamster, which lived on an isolated island at the approximate latitude and longitude of California. This island is about 1 square mile in area, and has several small streams to provide water. The animal, named the "flat-footed hoofelhimer," is an herbivore that eats the nut of a special plant. Luckily, many of these special plants exist on the island—enough plants, in fact, to provide food for 133 animals each week.

The simplified genetic structure of the animal had only 50 pairs of genes. Each of these 100 genes was either *on* or *off*. Using binary logic, the condition of each gene pair depended on the value of both genes in the pair, and whether or not the pair was *dominant* or *recessive*. A dominant pair would be considered on if one or both of its genes were on. A recessive pair would be on only if both genes were on. Each of the gene pairs controlled a trait or part of a trait in the animal. For example, one gene pair determined the animal's eye color, which could be either red or brown, with brown eyes dominant over red. If both genes in the pair were "off," then the animal would have red eyes; if either or both genes were "on," then the eyes would be brown. This is the way that eye color works in all animals (including humans), although in real life it is *much* more complex.

Approximating the Process

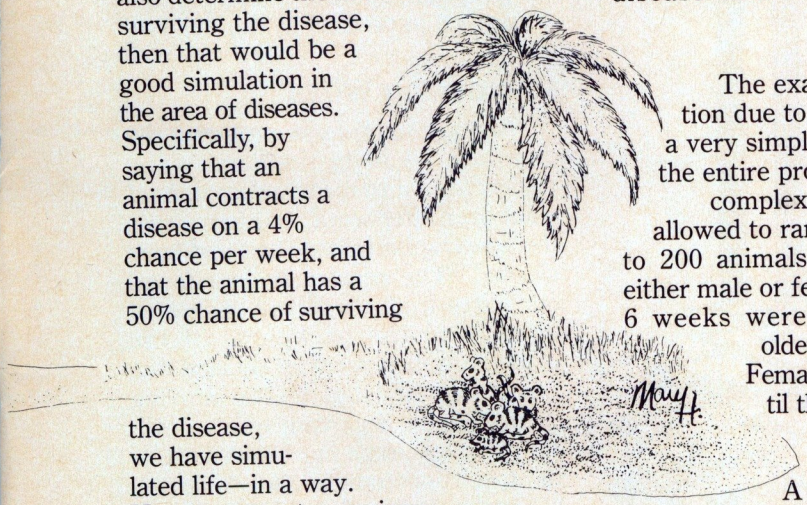
Understanding what causes evolution is as important as discovering whether it actually occurs. Darwin theorized that it was caused by a force called "natural selection," which means that the animals best adapted to their environments will have a greater chance of surviving than those animals which are not well adapted. Sounds like statistics to me, Watson—and statistics are one thing computers can do well.

So, I reasoned, if evolution due to natural selection occurs, then it occurs statistically—number-crunching to computers. Through statistics, life

can be reduced to a near infinite number of "chances" and, depending on the organism and on random probability, a statistically valid description of life can be created. Of course, a *completely* realistic simulation of life, taking into account every possibility, would be impossible to codify in one program.

Casting the Die

All that is needed is a reasonably valid statistical simulation of different aspects of life. For example, if we can determine the chance of an animal becoming diseased in a single week, and also determine the animal's chance of surviving the disease, then that would be a good simulation in the area of diseases. Specifically, by saying that an animal contracts a disease on a 4% chance per week, and that the animal has a 50% chance of surviving the disease, we have simulated life—in a way. However, most organisms have immune systems which protect them from disease, or help them survive after they contract a disease. These would modify the animal's chance of surviving the disease. Let's say that if the animal has a certain gene, then it has a 20% chance of fighting off the disease. Some of the animals will have this gene and others will not. If the chances of living or dying were 50–50 for the entire population, then evolution would not take place.



Suppose that 20 animals have the gene which gives them partial immunity while 80 do not. Each week about 4 animals would contract a disease. Let us suppose that in one week 5 animals contract a disease—2 animals which have the gene get sick, and 3 animals which do not have the gene get sick. The first animal with the gene has 20% immunity to the disease while the disease has a 50% effective rate. One time in 5 (20%), the animal will be immune to the disease and cannot die. On a random roll from 1 to 5, if the first animal does not get a 1 then it lacks immunity. The next roll is to determine whether the animal dies—a 1 in 2 chance.

Now consider the next partially immune animal. He gets a 1 on his immunity roll—thus, he has no chance of dying. Two of the three non-immune animals get 1's on the disease roll and die. So, out of 5 animals, 1 with the immunity to a disease and 1 without survive. As you can tell, if this process goes on over 5 years during which no new animals are born and none die for any other reason, the percentage of resistant animals would gradually increase. Why? because they have a 20% better chance of surviving the disease than their non-resistant brothers do.

Going Natural

The example above is evolution due to natural selection—in a very simplified form. However, the entire project was much more complex. The population was allowed to range anywhere from 1 to 200 animals, and each one was either male or female. Animals under 6 weeks were considered young, older animals were adults. Females could not mate until they were 6 weeks old, but males could mate in their first week. A pregnant female gave birth to between 1 and 5 young animals, three weeks after mating. These young left their mother in this first week and did not depend on her for food or protection. Since there was only enough food to feed 133 animals, if more than that existed during a week, some animals would starve to death.

The animals also had a natural enemy—a falcon-type bird which lived on a mainland across the ocean. Since the falcons could come and go freely on the island, the number of falcons depended on how many could find food. Generally, 1 falcon predator existed for every 25 animals alive. Each falcon killed one animal during a single week for food.

A disease struck on a base 4% chance, modified by the season and the age of the animal. There were five types of diseases: one killed on a base 20%, with others on 40%, 60%, 80%, and 99%. A plague occurred on a base .5% chance per week, but behaved exactly like a disease.

(Continued on page 36)

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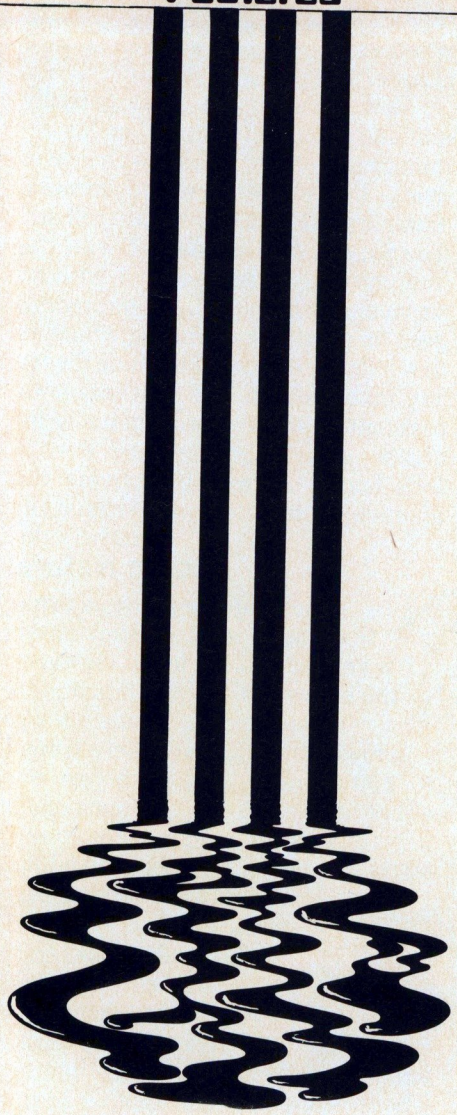


Apple of Steel

Alton Loe
ALCHEME Systems

IN 1981, I was asked if it was possible to use an APPLE II+ to control a spectrophotometer in a steel foundry. The spectrophotometer is used to measure the percentage of each of 16 elements in the batch of steel being smelted. It is important to know and to control the amount of each element, as it is a major factor in how the steel can be used. For example, certain types of steel are much less susceptible to corrosion than others.

The owner of the foundry wanted to know if the Apple could speed up calculations that they were currently doing with pencil and paper. The spectrophotometer would show a reading for each of the 16 elements. The operator would then compare the reading to two known standards for that particular type of steel, and do a linear interpolation to determine how much of each element was in the sample. He would then go back to the smelter and add a few pounds of one type of metal or another to bring the composition of the batch into specification. Running the sample through the spectrophotometer only takes a minute or two, but to properly take the readings and convert them to weight percentage might take from 10 to 20 minutes.

Let the Apple Do It

The Apple was connected directly to the spectrophotometer by means of a digital input/output card from Interactive Structures, and I wrote a program to control the machine. The program steps the spectrophotometer through each of the 16 elements, and reads the raw value directly from the LED output (through the I/S card). It then compares the readings to known standards and interpolates the weight percentages. It also compares the weight percentages to the desired tolerances for the product and prints a report for the operator, identifying those elements which are either in or out of specification. If all of the elements are within the desired tolerance, it prints a report for the customer stating both the "heat number" and the value for each element. For critical work, several samples can be run through the spectrophotometer, and the Apple will compute the average for each element as well as the standard deviation.

Child's Play

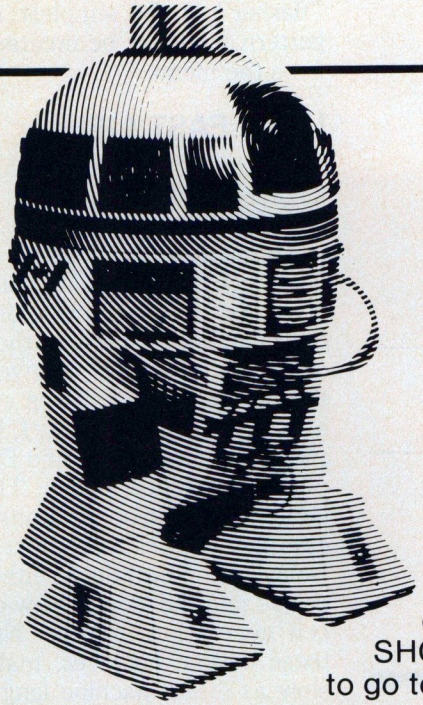
This all sounds so easy, but there were quite a few bugs to work out of the program and the interconnection between the Apple and the spectrophotometer. Late one afternoon, the foundry owner called me to announce that the version of the program I had given him earlier had just "bombed". Unfortunately, I was scheduled to work that evening, and had planned to be out of town on business the next day. Managing to find a few spare minutes (or hours), I was able to update the program. I then asked my wife if she would take it to them and install it the next day, as the foundry people knew practically nothing about the computer, except how to turn it on. Though agreeable to the task, she was unwilling to learn the details of LOAD, UNLOCK, SAVE, etc. at that time of night. Since it was summer vacation however, she was willing to take my 8 year old daughter (an expert at playing various sorts of games) to the foundry with her. The next morning, my daughter installed the program, and the foundry owner was much impressed by her ability.

Uncrossing Wires

Another time, I got a call that the computer was broken and they couldn't use it to measure anything. I went over after work, and found that the spectrophotometer had just been cleaned. The repairman had found our wires from the Apple connected directly to the backplane of the machine, and apparently decided that this just would not do. In moving them from the backplane to a removeable printed circuit card elsewhere in the spectrophotometer, he accidentally reversed two of the 18 digital inputs. Since these were the two used for a validity check on the data, the system would not accept readings from the spectrophotometer. Being less than a whiz with a soldering iron, I opted for a software patch to "reverse" the two digital inputs. This was completed in a few minutes and the operation was restored.

Just Keep the Kryptonite Away

This system has been installed for over three years, and is used on a daily basis to measure and report on the steel being cast at the foundry. Although the disk drives have been returned to the local dealer to be cleaned several times (the atmosphere there is very dusty), the hardware has performed flawlessly. The Interactive Structures card has never failed, nor has the computer. Outside of a few software bugs at the beginning, the system has consistently controlled the spectrophotometer and produced excellent results for the workers and customers alike.



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SHOW UP FOR THE SHOW

LIFE—

In the Fast Lane

Sam Vass & Sam Strickland

PROGRAMS that simulate the birth and death of living cell clusters have been around for years, written both in BASIC and in faster-running machine language (see *Call -A.P.P.L.E.*, November/December 1979, p. 30). Generally, you start by entering an initial cell pattern of your own design. Then the program takes over and—following pre-established rules—uses repetitive routines to determine which old cells die and which new ones are born, depending on the overall cell configuration at any given moment. The constantly changing cell patterns, which are displayed on the screen, continue until either all cells die out or the pattern becomes a repeating, endless loop. Some people approach it as a game, with the object of creating initial cell patterns that result in the most interesting, complex, or long-lasting displays. The original game of LIFE was invented by John Conway and described by Martin Gardner in *Scientific American* (October 1970 p.120, and February 1971 p.112).

Most existing versions of LIFE execute far slower than necessary because the data base is improperly defined and the microprocessor is improperly used. The much faster core routines shown here, written by Sam Strickland, demonstrate the necessity for defining data and program structure prior to writing a program. Implementations in BASIC usually require about 35–40 seconds per generation for a complex pattern, while a normal assembly language program requires about 1.7 seconds. This version, however, executes the same pattern in approximately 33 milliseconds per generation; i.e., fifty times faster.

Rules

The rules for LIFE are simple. The screen represents a two-dimensional grid of cell compartments. Each internal compartment has eight neighbors, and each compartment along an edge has five. Any empty compartment that has exactly three neighbors with a living cell has a birth. Any living cell with fewer than two living neighbors dies from loneliness. If a living cell has more than three neighbors, it dies from overcrowdedness. A starting pattern is required to provide a growth environment. Some patterns become repetitive and others die out quickly.

A simple pattern provides a demonstration. Start with three consecutive, internal, living cells, "*** ". The first and third cells will die from loneliness. At the same time, both empty cells above and below the center cell will give birth because they have three living neighbors. In the next generation, the top and bottom cells will die from loneliness, but they will cause new life to appear to the right and left of the center cell—thus restoring the starting pattern. This "flasher" is the simplest repetitive pattern, and can be created directly from the menu.

Using FAST LIFE

To use FAST LIFE, you should have both the Applesoft program (Listing 1) and the assembly language program (Listing 2, saved as LIFE.OBJ) on a disk. Running the program generates a screen menu of options. Select an option number (the selected option is displayed in inverse) and then press "ESC." When entering a new initial pattern, use I, J, K, and M for cursor movement, and D and F to plot or erase new points. The Glider Generator option demonstrates a complex, repetitive pattern. The Delay option introduces either of two delays into the loop to slow down the cell generation process. Neither of these delays, however, makes it as slow as other machine language implementations. The color of new cells changes for each generation. Touching any key during execution returns you to the menu.

Implementation

Conventional implementations of LIFE utilize two arrays containing the state of each cell. A loop then counts the neighbors for each cell and updates the screen. The fast version described in *Call -A.P.P.L.E.*, 1979, used both low resolution text screens as arrays and switched between them, eliminating any need to update the screen. The faster version presented here also has two arrays, but the arrays contain the neighbor count, with bit 6 indicating life. Therefore, no neighbor counting loop is required. This count is incremented or decremented along with the screen when birth or death occurs. As the 6502 sets the zero flag upon loading the accumulator, an immediate test is made for an empty cell with a branch to the next array element test. This branch has been carefully located in memory to prevent it from crossing a memory page boundary, saving one clock cycle per branch. For a mostly empty screen, such as a flasher, this will save one millisecond per generation. This may be a useful tip to remember when writing complex loops for assembly language graphics routines.

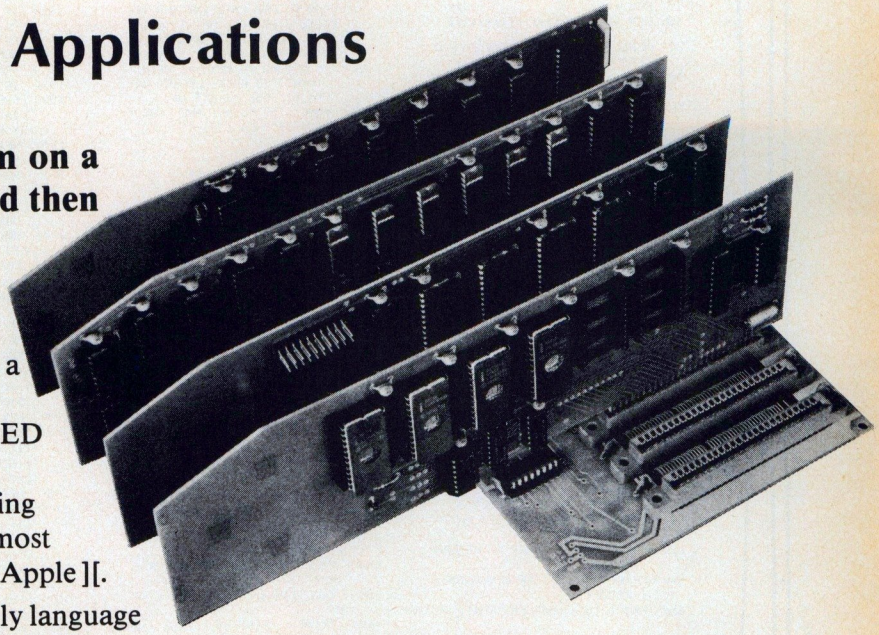
Scanning data without regard to screen order allows loops using index

(Continued on page 15)

APPLESEED

T.M.

Apple Compatible Hardware for Dedicated Applications



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64K RAM BOARD 64K of dynamic RAM with provision for control to be used in the normal Apple][conventions; deleting COOO-CFFF and software control over the DOOO-FFFF area.

EPROM BOARD Jumper selectable for 2716 (EPROM) or 34199 (PROM); blow 2716 assembly language programs and then run them in this EPROM board. Jumpers allow selection of software on/off, initialize on/off and other controls.

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UNIVERSAL BOARD The APPLESEED Universal board contains the following: One 2716 socket for an F8 PROM, one 2K × 8 bit RAM (0-7FF), one UART channel for serial communications, 8 parallel INPUT lines (TTL), 8 parallel OUTPUT lines (TTL), device decode for one additional standard slot-dependent board, support for standard Apple][style keyboard, and a power supply connection. Each feature is independent and any combination may be used simultaneously. The Universal board is designed to be used with the APPLESEED CPU board.

TEXT BOARD The TEXT board is designed to add the conventional TEXT (page 1 and page 2) to an APPLESEED system. The board generates composite video to plug into a standard monitor or T.V. modulator. The board provides 40 columns × 24 rows in each page and is not slot dependent.

MOTHER BOARD 10-slot motherboard is fully compatible with most Apple add-on cards currently available.

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Circle 17 on Reader Service Card

Listing 1

```
10  REM ************************
11  REM **                      **
12  REM ** LIFE                **
13  REM **                      **
14  REM ** SAM STRICKLAND       **
15  REM **                      **
16  REM ** SAM VASS             **
17  REM **                      **
18  REM ************************

30  PRINT  CHR$ (4);"BLOAD LIFE.O
    BJ"
40  POKE 0,0: POKE 1,68: POKE 2,0

50  DIM LI$(24):ME$ = "DEFGLOST":
    D$ =  CHR$ (4):QU$ =  CHR$ (
    34)
500 REM  *MENU*
510 HOME :SE = 0: VTAB 1: PRINT
    "LIFE-SAM STRICKLAND, APPLES
    OFT-SAM VASS": VTAB 2: HTAB
    18: PRINT "MENU":H = 8
520 FOR I = 1 TO 8: VTAB I * 2 +
    3: HTAB H: NORMAL : IF I = S
    E THEN  INVERSE
530 ON I GOSUB 610,620,630,640,6
    50,660,670,680: NEXT
540 VTAB 22: HTAB 6: NORMAL : PRINT
    "SELECT ? ": HTAB 6: PRINT "
    USE 'ESC' TO EXECUTE ";: GET
    SE$: FOR I = 1 TO 8: IF SE$ =
     MID$ (ME$,I,1) THEN ME = I
550 NEXT : IF SE$ =  CHR$ (27) AND
    SE <  > 0 THEN 590
560 IF ME < 1 OR ME > 8 THEN 540

570 SE = ME: GOTO 520
590 ON SE GOTO 810,1300,830,840,
    1600,850,1700,1900
610 CALL  - 868: PRINT "(D) DELA
    Y = ";DE: RETURN
620 PRINT "(E) ENTER A NEW PATTE
    RN": RETURN
630 PRINT "(F) FLASHER ": RETURN

640 PRINT "(G) GLIDER GENERATOR"
    : RETURN
650 PRINT "(L) LOAD PATTERN": RETURN

660 PRINT "(Q) QUIT ": RETURN
670 PRINT "(S) SAVE PATTERN": RETURN

680 PRINT "(T) TEST PATTERN": RETURN

810 DE = (DE = 0) * 127 + (DE = 1
    27) * 255 + (DE = 255) * 0: POKE
    2,DE:SE = 0: GOTO 520
820 HOME : RETURN
830 CALL  - 936: GR : VTAB 10: HTAB
    19: PRINT "***": GOTO 2000
840 CALL  - 936: GR : GOSUB 6000
    : GOTO 2000
850 TEXT : HOME : PRINT "END": END

1300 HOME : VTAB 2: PRINT "USE D
     AND F  FOR ENTERING AND DEL
    ETING": PRINT : PRINT "USE I
    ,J,K, AND M FOR CURSOR MOVEM
    ENT": PRINT : PRINT "USE ESC
     TO RETURN TO MENU ": PRINT
    : PRINT "TO EDIT CURRENT PAT
    TERN HIT ESC ": GET A$
1302 HOME : IF FL = 1 AND  ASC (
    A$) = 27 THEN 1330
1310 LI$(2) = "

1320 FOR I = 3 TO 23:LI$(I) = LI
    $(2): NEXT :FL = 1
1330 V = 10:H = 20
1400 FOR I = 2 TO 23: VTAB I: PRINT
    LI$(I): NEXT : HTAB H: VTAB
    V
1410 GET A$
1420 H = (A$ = "J") * ( - 1) * (H
     > 1) + (A$ = "K") * (H < 39
    ) + H:V = (A$ = "I") * ( - 1
    ) * (H > 1) + (A$ = "M") * (
    H < 23) + V
1430 IF A$ = "D" OR A$ = "F" THEN
    G = 32 * (A$ = "F") + 42 * (
    A$ = "D"):LI$(V) =  LEFT$ (L
    I$(V),H - 1) +  CHR$ (G) +
        RIGHT$ (LI$(V),40 - H)
1440 IF A$ =  CHR$ (27) THEN 500

1490 X =  FRE (0): GOTO 1400
1600 REM  LOAD FROM DISC
1610 HOME : GOSUB 1800: ONERR  GOTO
    1690
1620 I = 2
1630 PRINT D$;"OPEN";A$: PRINT D
    $;"READ";A$
1640 POKE 23,22: REM NUMBER OF L
    INES
1650 CALL 24804:LI$(I): REM LINP
    UT
1680 PRINT : PRINT D$;"CLOSE": GOTO
    500
1690 I = I + 1: GOTO 1650
1700 REM  SAVE TO DISC
1710 HOME : GOSUB 1800
1720 PRINT D$;"OPEN";A$: PRINT D
    $;"WRITE";A$: FOR I = 2 TO 2
    3: PRINT LI$(I): NEXT : PRINT
    D$;"CLOSE"
1730 GOTO 500
1800 PRINT "ENTER FILE NAME ? ":
     PRINT "TO CATALOG DISC, ENT
    ER RETURN ": PRINT "TO RETUR
    N TO MAIN MENU,ENTER ";QU$;"
    R";QU$: INPUT " ";A$: IF A$ =
    "" THEN  PRINT D$;"CATALOG":
     GOTO 1800
1810 IF A$ = "R" THEN  POP : GOTO
    500
1820 RETURN
1900 HOME : GR
1910 FOR I = 2 TO 23: VTAB I
1920 IF LI$(I) = "" THEN 1980
1930 FOR J = 2 TO 39: IF  MID$ (
    LI$(I),J,1) = "*" THEN  HTAB
    J: PRINT "*";
1970 NEXT
1980 NEXT
2000 REM  DISPLAY
2010 CALL 23201: TEXT : HOME : GOTO
    500: REM  DELETE LINE IF NOT
     USING MACROSOFT
2014 POKE 24873,96: REM  INSERT
    RTS
2020 FOR I = 25641 TO 26574: POKE
    I,0: NEXT : REM *MACROSOFT L
    INES 24-26*
2040 B = 25679:J = 128: FOR I = 1
     TO 8: POKE B,192:B = B + J:
     NEXT : REM LINES 27-32
2060 FOR I = 1153 TO 1910: IF  PEEK
    (I) = 170 THEN B = I + 24447
    : GOSUB 2500:B = I + 24703: GOSUB
    2500: GOSUB 2600
2070 NEXT : REM LINES 33-41
2080 FOR I = 1065 TO 1142: IF  PEEK
    (I) = 170 THEN B = I + 25431
    : GOSUB 2500:B = I + 24703: GOSUB
    2500: GOSUB 2600
2090 NEXT : REM LINES 42-50
2100 FOR I = 1921 TO 1998: IF  PEEK
    (I) = 170 THEN B = I + 24447
    : GOSUB 2500:B = I + 23719: GOSUB
    2500: GOSUB 2600
2110 NEXT : REM LINES 51-59
2120 CALL 24193: REM  $5E81
2130 TEXT : HOME : GOTO 500
2500 REM PEOK
2510 POKE B, PEEK (B) + 1:B = B +
    1: POKE B, PEEK (B) + 1:B =
    B + 1: POKE B, PEEK (B) + 1:
     RETURN : REM LINES 61-72
2600 REM PEOK1
2610 B = I + 24575: POKE B, PEEK
    (B) + 1:B = B + 1: POKE B, PEEK
    (B) + 32:B = B + 1: POKE B, PEEK
    (B) + 1: RETURN : REM LINES
    73-85

5000 TEXT : HOME : GOTO 500
6000 REM   GLIDER GENERATOR
6010 V = 7
6030 VTAB V: HTAB 14: PRINT "**"

6032 VTAB V + 3: HTAB 10: PRINT
    "*"
6040 VTAB V + 1: HTAB 14: PRINT
    "**"
6050 VTAB V + 5: HTAB 14: PRINT
    "**"
6060 VTAB V + 6: HTAB 14: PRINT
    "**"
6070 VTAB V + 2: HTAB 19: PRINT
    "*****"
6080 VTAB V + 3: HTAB 21: PRINT
    "**"
6090 VTAB V + 5: HTAB 20: PRINT
    "*"
6092 VTAB V + 1: HTAB 20: PRINT
    "*"
6094 VTAB V + 8: HTAB 25: PRINT
    "**"
6100 VTAB V + 3: HTAB 18: PRINT
    "*"
6110 VTAB V + 4: HTAB 18: PRINT
    "**"
6112 VTAB V + 3: HTAB 3: PRINT "
    **"
6114 VTAB V + 4: HTAB 3: PRINT "
    **"
6116 VTAB V + 2: HTAB 11: PRINT
    "**"
6118 VTAB V + 3: HTAB 11: PRINT
    "**"
6119 VTAB V + 4: HTAB 11: PRINT
    "**"
6120 VTAB V + 2: HTAB 25: PRINT
    "**"
6130 VTAB V + 4: HTAB 28: PRINT
    "*"
6140 VTAB V + 5: HTAB 28: PRINT
    "*"
6142 VTAB V + 6: HTAB 28: PRINT
    "*"
6150 VTAB V + 7: HTAB 27: PRINT
    "*"
6154 VTAB V + 3: HTAB 27: PRINT
    "*"
6160 VTAB V + 4: HTAB 37: PRINT
    "**"
6170 VTAB V + 5: HTAB 37: PRINT
    "**"
6190 RETURN
```

Listing 2

```
;********************************
;**                            **
;**       Listing 2            **
;**                            **
;**       LIFE BY              **
;**                            **
;**       SAM STRICKLAND       **
;**                            **
;**       EDITED BY            **
;**                            **
;**       SAM VASS             **
;********************************
;
;
;IF NOT USING MACROSOFT DELETE FROM HERE THRU LINE 87
;
        USE MACROSOFT 1.0
        UEN
        MUL
        BEGIN 23201       ;ORG $5AA1, LEN $6BA
        VAR I,J,B
        FOR I=25641,26574 ;SET ARRAY TO 0
        POKE I,0
        NEXT I
        LET B=25679
        LET J=128
        FOR I=1,8
        POKE B,192
        LET B=B+J
        NEXT I
        FOR I=1153,1910 ;LOOP TO SET ARRAY 1
        PEEK J,I          ;J = PEEK(I)
        IF J#170, GOTO JNEXT ;IF NOT *, THEN NEXT
        LET B=I+24447
        GOSUB PEOK
        LET B=I+24703
        GOSUB PEOK
        GOSUB PEOK1
JNEXT   NEXT I
        FOR I=1065,1142
        PEEK J,I
        IF J#170, GOTO JNEXT
        LET B=I+25431
        GOSUB PEOK
        LET B=I+24703
        GOSUB PEOK
        GOSUB PEOK1
JNEXT   NEXT I
        FOR I=1921,1998
        PEEK J,I
        IF J#170, GOTO JNEXT
        LET B=I+24447
        GOSUB PEOK
        LET B=I+23719
        GOSUB PEOK
        GOSUB PEOK1
JNEXT   NEXT I
        GOTO INIT
PEOK    PEEK J,B
        INCR J
        POKE B,J
        INCR B
        PEEK J,B
        INCR J
        POKE B,J
        INCR B
        PEEK J,B
        INCR J
        POKE B,J
        RETURN
PEOK1   LET B=I+24575
        PEEK J,B      ;ADD ONE FOR
        INCR J        ;LIVING
        POKE B,J      ;NEIGHBOR
        INCR B        ;ADD 32
        PEEK J,B      ;IF CELL
        LET J=J+32    ;ALIVE
        POKE B,J
        INCR B
        PEEK J,B
        INCR J
        POKE B,J
        RETURN
;
;END OF DELETION-REPLACE WITH BASIC
;
;IF DELETING MACROSOFT, INSERT NEW ORG HERE OF $5E81
;
```

```
 91 BCKGND   EQU $00          ;COLOR OF DEAD CELL
 92 BIRTH    EQU $01          ;COLOR OF LIVE CELL
 93 DELAY    EQU $02
 94 A1L      EQU $3C
 95 A1H      EQU $3D
 96 A2L      EQU $3E
 97 A2H      EQU $3F
 98 A4L      EQU $42
 99 A4H      EQU $43
100 WAIT     EQU $FCA8
101 MOVE     EQU $FE2C        ;MONITOR MOVE
102 INIT     LDY #$00         ;SET UP MOVE
103          LDA #$64
104          STY A1L
105          STA A1H
106          LDA #$CE
107          STA A2L
108          LDA #$67
109          STA A2H
110          STY A4L
111          LDA #$68
112          STA A4H
113          JSR MOVE
114 \NBFR    EQU $6880
115 ;START OF MAIN LOOP
116 ;
117 ;RULES
118 ;IF A CELL IS DEAD AND HAS 3 NEIGHBORS, THEN BIRTH
119 ;IF A CELL IS LIVE AND HAS < 2 OR >3 NEIGHBORS, THEN KILL IT
120 ;
121 TOP      CLV
122          LDX #$F6
123 JLOOP    LDA  \NBFR - $400,X ;LOAD ARRAY 1 VALUE
124          BEQ JNEXT    ;HERE TO JNEXT SHOULD NOT CROSS PAGE BOUNDARY
125          CMP #$03
126          BEQ JBIRTH   ;IF 3 NEIGHBORS, THEN BIRTH
127          CMP #$20
128          BMI JNEXT
129          CMP #$23
130          BEQ JNEXT
131          CMP #$22
132          BEQ JNEXT
133 ;KILL A CELL
134          LDA \NBFR,X
135          AND #$DF         ;CLEAR BIT 6
136          STA \NBFR,X
137          DEC \NBFR -  $81,X ;DECREMENT NEIGHBOR COUNT
138          DEC \NBFR -  $80,X
139          DEC \NBFR -  $7F,X
140          DEC \NBFR -  $01,X
141          DEC \NBFR +  $01,X
142          DEC \NBFR +  $7F,X
143          DEC \NBFR +  $80,X
144          DEC \NBFR +  $81,X
145          LDA BCKGND
146          STA  \NBFR -  $6400,X ;KILL CELL ON SCREEN
147          BVC JNEXT        ;BRANCH ALWAYS
148 ;BIRTH A CELL
149 JBIRTH   LDA \NBFR,X
150          ORA #$20         ;SET BIT 6 TO REFLECT LIFE
151          STA \NBFR,X
152          INC \NBFR -  $81,X
153          INC \NBFR -  $80,X
154          INC \NBFR -  $7F,X
155          INC \NBFR -  $01,X
156          INC \NBFR +  $01,X
157          INC \NBFR +  $7F,X
158          INC \NBFR +  $80,X
159          INC \NBFR +  $81,X
160          LDA BIRTH        ;COLOR OF LIVE CELL
161          STA \NBFR -  $6400,X ;CREATE LIFE  ON SCREEN
162 \NBFR    EQU $6980
163 JNEXT    LDA \NBFR -  $400,X
164          BEQ JNEXT        ;SEE COMMENT LINE 117 ABOVE
165          CMP #$03
166          BEQ JBIRTH
167          CMP #$20
168          BMI JNEXT
169          CMP #$23
170          BEQ JNEXT
171          CMP #$22
172          BEQ JNEXT
173          LDA \NBFR,X
174          AND #$DF
175          STA \NBFR,X
176          DEC \NBFR -  $81,X
177          DEC \NBFR -  $80,X
178          DEC \NBFR -  $7F,X
179          DEC \NBFR -  $01,X
180          DEC \NBFR +  $01,X
181          DEC \NBFR +  $7F,X
182          DEC \NBFR +  $80,X
183          DEC \NBFR +  $81,X
184          LDA BCKGND
185          STA  \NBFR -  $6400,X
186          BVC JNEXT
187 JBIRTH   LDA \NBFR,X
188          ORA #$20
189          STA \NBFR,X
190          INC \NBFR -  $81,X
191          INC \NBFR -  $80,X
192          INC \NBFR -  $7F,X
193          INC \NBFR -  $01,X
194          INC \NBFR +  $01,X
195          INC \NBFR +  $7F,X
196          INC \NBFR +  $80,X
197          INC \NBFR +  $81,X
198          LDA BIRTH
199          STA \NBFR -  $6400,X
200 \NBFR    EQU $6A80
201 JNEXT    LDA \NBFR -  $400,X
202          BEQ JNEXT
203          CMP #$03
204          BEQ JBIRTH
205          CMP #$20
206          BMI JNEXT
207          CMP #$23
208          BEQ JNEXT
209          CMP #$22
210          BEQ JNEXT
211          LDA \NBFR,X
212          AND #$DF
213          STA \NBFR,X
214          DEC \NBFR -  $81,X
215          DEC \NBFR -  $80,X
216          DEC \NBFR -  $7F,X
217          DEC \NBFR -  $01,X
218          DEC \NBFR +  $01,X
219          DEC \NBFR +  $7F,X
220          DEC \NBFR +  $80,X
221          DEC \NBFR +  $81,X
222          LDA BCKGND
223          STA  \NBFR -  $6400,X
224          BVC JNEXT
225 JBIRTH   LDA \NBFR,X
226          ORA #$20
227          STA \NBFR,X
228          INC \NBFR -  $81,X
229          INC \NBFR -  $80,X
230          INC \NBFR -  $7F,X
231          INC \NBFR -  $01,X
232          INC \NBFR +  $01,X
233          INC \NBFR +  $7F,X
234          INC \NBFR +  $80,X
235          INC \NBFR +  $81,X
236          LDA BIRTH
237          STA \NBFR -  $6400,X
238 JNEXT    DEX
239          BEQ JLOOP1
240          JMP  JLOOP
241 \NBFR    EQU $6828
242 JLOOP1   LDX #$36
243 JLOOP    LDA \NBFR -  $400,X
```


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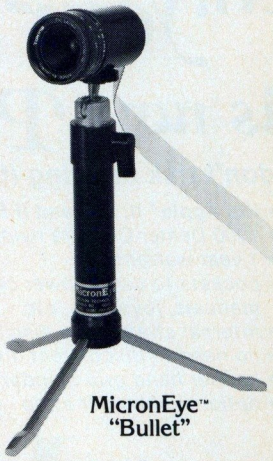

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Circle 49 on Reader Service Card

```
244             BEQ JNEXT
245             CMP #$03
246             BEQ JBIRTH
247             CMP #$20
248             BMI JNEXT
249             CMP #$23
250             BEQ JNEXT
251             CMP #$22
252             BEQ JNEXT
253             LDA \NBFR,X
254             AND #$DF
255             STA \NBFR,X
256             DEC \NBFR + $359,X
257             DEC \NBFR + $358,X
258             DEC \NBFR + $357,X
259             DEC \NBFR -  $01,X
260             DEC \NBFR +  $01,X
261             DEC \NBFR +  $7F,X
262             DEC \NBFR +  $80,X
263             DEC \NBFR +  $81,X
264             LDA BCKGND
265             STA  \NBFR -  $6400,X
266             BVC JNEXT
267 JBIRTH     LDA \NBFR,X
268             ORA #$20
269             STA \NBFR,X
270             INC \NBFR + $359,X
271             INC \NBFR + $358,X
272             INC \NBFR + $357,X
273             INC \NBFR -  $01,X
274             INC \NBFR +  $01,X
275             INC \NBFR +  $7F,X
276             INC \NBFR +  $80,X
277             INC \NBFR +  $81,X
278             LDA BIRTH
279             STA \NBFR -  $6400,X
280 \NBFR      EQU $6880
281 JNEXT     LDA \NBFR -  $400,X
282             BEQ JNEXT
283             CMP #$03
284             BEQ JBIRTH
285             CMP #$20
286             BMI JNEXT
287             CMP #$23
288             BEQ JNEXT
289             CMP #$22
290             BEQ JNEXT
291             LDA \NBFR,X
292             AND #$DF
293             STA \NBFR,X
294             DEC \NBFR - $81,X
295             DEC \NBFR - $80,X
296             DEC \NBFR - $7F,X
297             DEC \NBFR -  $01,X
298             DEC \NBFR +  $01,X
299             DEC \NBFR - $359,X
300             DEC \NBFR - $358,X
301             DEC \NBFR - $357,X
302             LDA BCKGND
303             STA  \NBFR -  $6400,X
304             BVC JNEXT
305 JBIRTH     LDA \NBFR,X
306             ORA #$20
307             STA \NBFR,X
308             INC \NBFR -  $81,X
309             INC \NBFR -  $80,X
310             INC \NBFR -  $7F,X
311             INC \NBFR -  $01,X
312             INC \NBFR +  $01,X
313             INC \NBFR - $359,X
314             INC \NBFR - $358,X
315             INC \NBFR - $357,X
316             LDA BIRTH
317             STA \NBFR -  $6400,X
318 JNEXT      DEX
319             BEQ JLOOP1
320             JMP CLOOP
321 ;MOVE ARRAY 2 TO ARRAY 1
322 \NBFR      EQU $6800
323 JLOOP1     LDX #$76
324 JLOOP      LDA \NBFR + $80,X
325             STA \NBFR - $380,X
326             LDA \NBFR + $100,X
327             STA \NBFR - $300,X
328             LDA \NBFR + $180,X
329             STA \NBFR - $280,X
330             LDA \NBFR + $200,X
331             STA \NBFR - $200,X
332             LDA \NBFR + $280,X
333             STA \NBFR - $180,X
334             LDA \NBFR + $300,X
335             STA \NBFR - $100,X
336             DEX
337             BNE CLOOP
338             LDX #$4E
339 JLOOP      LDA \NBFR + $28,X
340             STA \NBFR - $3D8,X
341             LDA \NBFR + $380,X
342             STA \NBFR - $80,X
343             DEX
344             BNE CLOOP
345             LDA $C000        ;CHECK KEYBOARD
346             BMI STOP         ;IF KEYHIT, THEN GOTO STOP
347             CLC
348             LDA BIRTH
349             ADC #$11         ;INCREMENT COLOR
350             STA BIRTH
351             BCC STALL
352             INC BIRTH
353 STALL      LDA DELAY
354             BEQ CONT
355             JSR WAIT
356 CONT       JMP TOP
357 ;END OF MAIN LOOP
358 ;
359 ;INPUT ALMOST ANYTHING-KEEPS LEADING SPACES
360 LINPUT     LDA #$3A
361             JSR $DEC0        ;CHECK FOR COLON
362             JSR $DFE3        ;GET ADDRESS OF DESCRIPTOR
363             LDX #$00
364             JSR $FD75
365             CPX #$00
366             BEQ JNEXT
367             STX $FD          ;X IS STRING LENGTH
368             JSR $D539
369             LDA $FD
370             JSR $E452        ;GET SPACE
371             LDX #$00
372             LDY #$02         ;HIGH BYTE OF KYBD BUFFER
373             JSR $E5E2        ;MOVE STRING TO FRETOP
374             LDY #$00
375             LDA $FD          ;STRING LENGTH
376             STA ($83),Y      ;CHANGE STR DESCRIPTOR
377             INY
378             LDA $6F          ;FRETOP LOW BYTE
379             STA ($83),Y
380             INY
381             LDA $70          ;FRETOP HIGH BYTE
382             STA ($83),Y
383 JNEXT      DEC $17
384             BNE JNEXT
385             RETURN
386 JNEXT      CLC
387             LDA #$03
388             ADC $83
389             STA $83
390             BCC LINPUT
391             INC $84
392             JMP LINPUT
393 ;IF NOT USING MACROSOFT, USE "STOP RTS" INSTEAD OF 394
394 STOP       TEXT                                    AND 395
395             END
```


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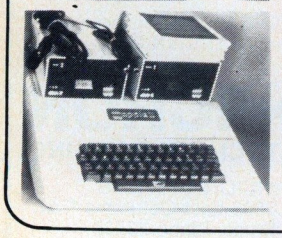

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registers x and y. If you locate array 1 an exact number of high bytes above the screen, and array 2 an exact number of high bytes above array 1, then scanning the screen without regard to order (by using neighbor count arrays) allows you to use the x register value for testing array 1, modify the screen for life and death, and modify array 2 using the fast INC/ DEC instruction. Later, array 2 can be moved to array 1 using the x register. This way it is not necessary to use CLC or ADC instructions, nor calculations of screen locations. The following is a memory map as used by the program:

Screen	**$400-$7FF**
Array 1	**$6400-$67FF**
Array 2	**$6800-$6BFF**

At the end of the test routines, array 2 is moved to array 1 to prepare for the next generation, the keyboard is checked for an exit command, delay is checked, and the color is incremented.

Even Faster LIFE

Both arrays must be initialized with neighbor counts after the test pattern is entered and prior to entering the loop. The initialization routine in Listing 1, lines 2000 to 2610, causes at least a 10 second delay between the creation of a new initial pattern and the execution of the cell growth program. One way to speed things up even more is to convert the initialization procedure into machine language.

Rather than write complex loops in pure assembly language, we took advantage of one of the capabilities of The Assembler and used Macrosoft to translate BASIC into assembly language. As you can see from the source code, lines 21 through 85 appear to be BASIC. Line 33 starts a normal FOR–NEXT loop with the NEXT in line 41. Finally, LINPUT (359–393) is a version of "Input Nearly Anything" used to load leading spaces from a sequential file record and can be used with any program.

If you do not use Macrosoft (or the equivalent), then delete line 2010 in Listing 1 and ignore lines 17 through 87 in Listing 2. On the other hand, if you choose to include initialization in the machine language program rather than the BASIC program, then omit lines 2014 through 2610 in Listing 1. Either way, the changing cell pattern routines will execute at the same speed.

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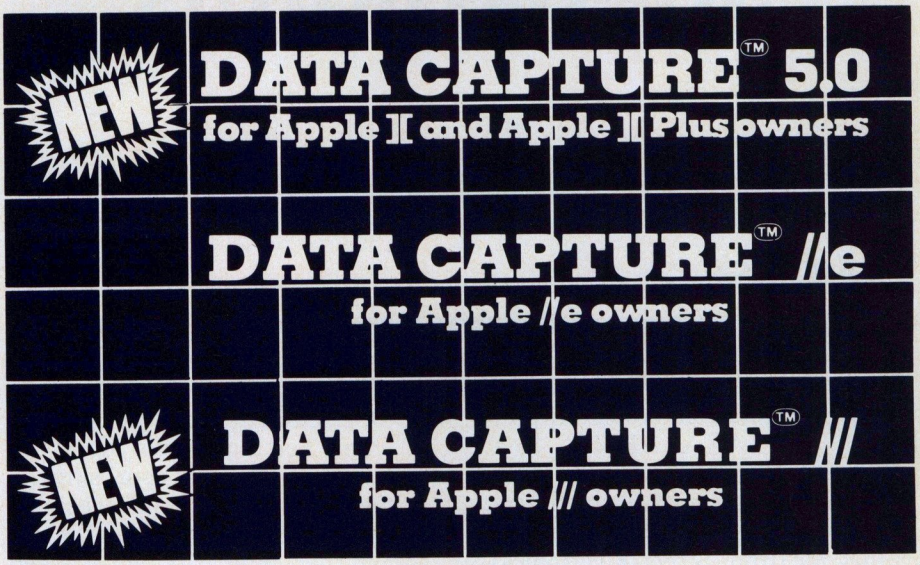

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Speakalarms

Tim Kendrick

FOR those with both a clock card and speech synthesizer installed in your Apple, "SPEAKALARMS" is a talking alarm clock/calendar program. It will work without modification with the popular ECHO II speech synthesizer (from Street Electronics) and the TIMEMASTER clock from Applied Engineering, but it should not be difficult to modify to work with other brands.

My thanks to Clay Ruth for allowing me to use his basic speech editing routines (*Call –A.P.P.L.E, Oct '83*) to enter and edit alarm messages, and for some useful debugging tips.

Keeping Up to Date

The program lets you set up a text file of alarm times (up to a year ahead) with a different message to be spoken on each occasion, the messages being limited only by your own imagination and computer memory. The file can be saved on a disk, modified and added to at will.

You are given ample flexibility in setting alarm times. For example, you might want it to speak a reminder at 10 minutes past *every* hour—or only at 17 minutes past the hour on Sundays in November. You can set it to say "BUY LOLITA A PRESENT TODAY" at 7:30 a.m. two days before a birthday next March, and "PUT THE CAT OUT" every night at midnight. I have allowed up to 100 alarms in the program (DIM'd at line 40) but this is not necessarily the limit if you have enough memory space for more.

A few tips on using it:

1. You don't have to fill in *every* option when asked for by the date/time setting menu. For example, when setting to go off at 10 minutes past every hour, skip the month, day, hour, and weekday by just pressing "RETURN", and then enter "10" when asked for minutes. In the unlikely event you needed an alarm to go off continuously all January, just enter "1" for the month and skip the other entries by pressing RETURN.
2. Most errors, like trying to save a file to an empty disk drive, will return you to the main menu with the file in memory still intact—but it is still a good idea to save periodically to disk when entering a long and carefully composed file of alarms. Who knows, I may have missed a bug that will wreck your file. This is easy to do when working several hardware cards at once (although I've fixed so many already there *can't* be many left!).
3. Loading a file from disk will automatically run the catalog for you first before asking for the file name.

Synchronizing the Clock

For those with a clock card other than the "TIMEMASTER," modifying the program should be quite easy. The subroutine starting at line 1830 gets a complete date and time string from the clockcard and names it "T$." Alter the program to have your clock do the same.

The TIMEMASTER returns a 19 character string in the following format:

	(chr #)
WEEKDAY	1
(SPC)	2
MONTH	3,4
/	5
DAY OF MONTH	6,7
/	8
YEAR	9,10
(SPC)	11
HOUR	12,13
;	14
MINUTE	15,16
;	17
SECOND	18,19

This string prints in full for reference each time an alarm goes off, and you could modify the program to speak it if you wanted. We don't use the year and seconds in the program. The time part of each alarm string you have set in memory is 14 characters long and looks like this:

	(chr#)
WEEKDAY	1
(SPC)	2
MONTH	3,4
/	5
DAY OF MONTH; 6,7	
/	8
(SPC)	9
HOUR	10,11
.	12
MINUTE	13,14

When the alarm is set and running, program lines 1470 to 1520 check each component of the two strings to see if there is a match—in other words, is it time to speak an alarm? An example: If you have just set the minutes to "10," then each time you had bypassed the other entries (month etc.) by pressing "RETURN," the program set the entry to be "**" (at line 1690). The checking routine described above treats this as a match regardless of what the actual date/time is (with the exception that the minute must match "10" because that was actually set rather than bypassed). Hence you get an alarm at ten past every hour of every day of every month.

This example illustrates how to modify the routine if your particular clock returns a date/time string in slightly different format. As for the rest of the program, I have liberally sprinkled it with "REM"s with the hope that it is self-explanatory and easy to change.

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150

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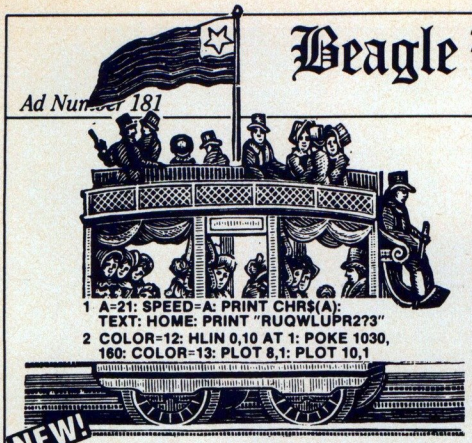

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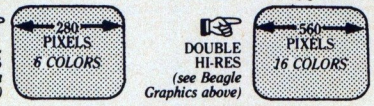

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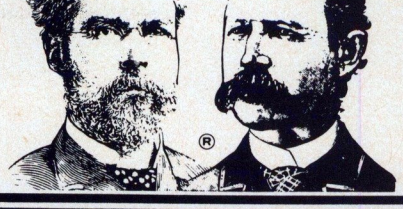

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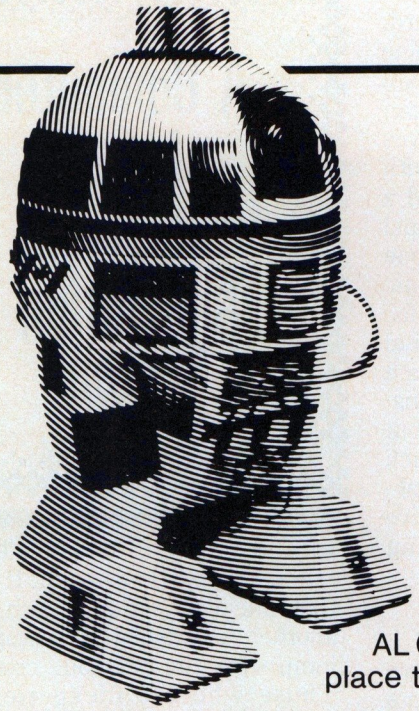
SPEAKALARMS

```
10  REM    INITIALIZE*************
20  HOME : PRINT "'SPEAKALARMS' PROGRAM BY:": PRINT : PRINT "TIM KENDRICK
                              BOX 472                                    O
   CEAN FALLS                             B.C. VOT IPO CANADA"
30  PRINT : PRINT "ALARM ENTERING AND EDITING ROUTINES     ADAPTED FROM A
    PROGRAM BY CLAY RUTH": ONERR  GOTO 1860
40 D$ =  CHR$ (13) +  CHR$ (4):E$ =  CHR$ (5): DIM RE$(100): REM  MAX.NO.
    OF ALARMS COULD BE>100 IF YOU HAVE MEMORY
50  REM  E$ IS 'CONTROL E' - THE SETUP FOR ECHO II COMMANDS
60  VTAB 15: INVERSE : PRINT "TOUCH 'L'IF YOU NEED TO LOAD TEXTALKER, OTH
   ERWISE TOUCH 'RETURN' TO CONTINUE": NORMAL
70  GET Z$: IF Z$ = "L" THEN  PRINT D$"BRUN TEXTALKER.RAM": REM  AMEND TH
   IS IF YOU DON'T HAVE RAMCARD
80  PRINT E$"O": REM  TURN SPEECH OFF
90  PRINT D$"PR#0": REM  ENSURE ECHOII & TEXTALKER CONNECTED

100  REM  START MAIN MENU*********************
110  TEXT : NORMAL : HOME :NR = TR: PRINT "1. LOAD ALARM FILE FROM DISK"
120  PRINT : PRINT "2. TEST RUN ALL ALARM MESSAGES"
130  PRINT : PRINT "3. START ALARM CLOCK"
140  PRINT : PRINT "4. MODIFY AN ALARM"
150  PRINT : PRINT "5. ADD NEW ALARM(S)"
160  PRINT : PRINT "6. DELETE ONE OR MORE ALARMS"
170  PRINT : PRINT "7. SAVE ALARM FILE TO DISK"
180  PRINT : PRINT "8. ERASE ALARMS IN MEMORY & START ANEW"
190  PRINT : PRINT "9. EXIT PROGRAM"
200  PRINT : PRINT : PRINT "-> WHICH? (TOUCH A NUMBER)": GET Z$:VZ =  VAL
    (Z$)
210  IF VZ < 1 OR VZ > 9 THEN  PRINT  CHR$ (7): GOTO 110
220  ON VZ GOSUB 720,410,1390,820,240,970,610,260,1830
230  GOTO 110
240  IF TR = 0 THEN 260
250  GOTO 290
260  REM  START NEW FILE OF ALARMS************
270  HOME : VTAB 10: PRINT  CHR$ (7)"THIS WILL ERASE ANY ALARMS PRESENTLY
      IN MEMORY. IS THIS OK? (Y/N)": GET Z$: IF Z$ <  > "Y" THEN  RETURN

280 TR = 0:NR = 0: FOR I = 1 TO TR:RE$(I) = "": NEXT : REM  NULLS PREVIOU
   SLY ALLOCATED STRINGS
290  HOME : VTAB 2: PRINT "MAX. ALARM MESSAGE = 235 CHARACTERS"
300 NR = NR + 1: GOSUB 1190: REM  GO TO SET ALARM TIME
310  PRINT "MESSAGE:"
320 VT =  PEEK (37) + 1
330  REM  START INPUT ROUTINE FOR ALARM MESSAGE
340  PRINT NR;: INPUT ") ";AM$: IF AM$ = "" THEN  VTAB VT: GOTO 330
350  IF  LEN (AM$) > 235 THEN  PRINT  CHR$ (7)"MESSAGE TOO LONG": FOR I =
   1 TO 3000: NEXT : GOTO 280
360  PRINT E$"T": PRINT AM$;: PRINT E$"O": REM  SPEAKS NEW MESSAGE
370  CALL  - 958: PRINT : PRINT "DOES THAT SOUND O.K.? (Y/N)";
380  GET Z$: IF Z$ <  > "Y" AND Z$ <  > "N" THEN  PRINT  CHR$ (7): GOTO 3
   80
390  PRINT Z$: IF Z$ = "N" THEN  VTAB VT: CALL  - 958: PRINT NR;") ";AM$:
    VTAB VT: GOTO 330
400 RE$(NR) = "" + AL$ + AM$: GOTO 300: REM  COMBINES TIME AND MESSAGE IN
   TO ONE STRING
410  REM  START ALARM TEST ROUTINE************
420  HOME : VTAB 4: PRINT "THERE ARE ";TR" ALARMS IN MEMORY "
430  IF TR = 0 THEN  PRINT "THERE ARE NO ALARMS ON FILE SO AM GOING BACK
   TO THE MAIN MENU": FOR I = 1 TO 5000: NEXT : RETURN
440  VTAB 7: PRINT "1. SPEAK ALL ALARMS"
450  PRINT : PRINT "2. SPEAK A CHOSEN RANGE OF ALARMS"
460  VTAB 14: PRINT "TOUCH '1' OR '2'": GET Z$: IF Z$ = "" THEN  RETURN
470  IF Z$ <  > "1" AND Z$ <  > "2" THEN  PRINT  CHR$ (7): GOTO 410
480  IF Z$ = "1" THEN A1 = 1:A2 = TR: GOTO 550
490  VTAB 16: INPUT "FIRST ALARM NUMBER = ";Z$
500 VZ =  VAL (Z$): IF VZ < 1 OR VZ > TR THEN  PRINT  CHR$ (7): GOTO 490
510 A1 = VZ: CALL  - 958
520  VTAB 18: INPUT "LAST ALARM NUMBER = ";Z$
530 VZ =  VAL (Z$): IF VZ < A1 OR VZ > TR THEN  PRINT  CHR$ (7): GOTO 520

540 A2 = VZ
550  HOME : FOR NR = A1 TO A2
560 AL$ =  LEFT$ (RE$(NR),14):AM$ =  RIGHT$ (RE$(NR), LEN (RE$(NR)) - 14)
   : PRINT NR;") ";: REM   SPLIT STRING INTO TIME & MESSAGE
570  PRINT AL$: REM  PRINT COMPLETE TIME & MESSAGE STRING
580  PRINT E$"B";: PRINT AM$;: PRINT E$"O": REM  SPEAK ALARM MESSAGE
590  NEXT
600  RETURN
610  REM   START ALARM FILE SAVE ROUTINE******
620  HOME : VTAB 4: PRINT "ENTER NAME FOR THE ALARM FILE:"
630  PRINT : INPUT FI$: IF FI$ = "" THEN  RETURN
640  PRINT D$"OPEN"FI$
650  PRINT D$"WRITE"FI$
660  PRINT TR
670  FOR NR = 1 TO TR
680  PRINT RE$(NR)
690  NEXT
700  PRINT D$"CLOSE"
710  RETURN
720  REM  START ALARM FILE LOAD ROUTINE*******
730  HOME : PRINT D$"CATALOG"
740  INVERSE : INPUT "NAME OF FILE? ";FI$: NORMAL : IF FI$ = "" THEN  RETURN

750  PRINT D$"UNLOCK"FI$: PRINT D$"OPEN"FI$: REM  UNLOCK TESTS TO SEE IF
   FILE EXISTS
760  PRINT D$"READ"FI$
770  INPUT TR
780  FOR NR = 1 TO TR
790  INPUT RE$(NR)
800  NEXT
810  PRINT D$"CLOSE":NR = TR: RETURN
820  REM  START ALARM AMEND ROUTINE***********
830  HOME
840  VTAB 10: PRINT "THERE ARE "TR" ALARMS IN MEMORY"
850  INPUT "WHICH ALARM# DO YOU WANT TO CHANGE? ";Z$: IF Z$ = "" THEN  RETURN

860 VZ =  VAL (Z$): IF VZ < 1 OR VZ > TR THEN  PRINT  CHR$ (7): GOTO 820
870 NR = VZ: CALL  - 958
880  PRINT "OLD ALARM#"NR" TIME AND MESSAGE WAS:"
890  INVERSE : PRINT RE$(NR): NORMAL : PRINT
900  PRINT : PRINT : PRINT "TOUCH RETURN TO ENTER AMENDED ALARM": GET Z$:
    GOSUB 1190
910  VTAB 15: PRINT NR;: INPUT ") MESSAGE: ";AM$
920  PRINT E$"T": PRINT AM$: PRINT E$"O": REM  SPEAKS NEW MESSAGE
930  VTAB 22: PRINT "DOES THAT SOUND O.K.?(Y/N) ";: GET Z$
940  IF Z$ <  > "Y" AND Z$ <  > "N" THEN  PRINT  CHR$ (7): GOTO 930
950  PRINT Z$: IF Z$ = "N" THEN  VTAB 22: CALL  - 958: GOTO 910
960 RE$(NR) = "" + AL$ + AM$: RETURN : REM  COMBINES TIME & MESSAGE INTO
   ONE STRING
970  REM  START DELETE ALARM ROUTINE
980  HOME : VTAB 4: PRINT "THERE ARE "TR" ALARMS IN THE FILE."
990  VTAB 10: INPUT "FIRST ALARM TO DELETE: #";Z$: IF Z$ = "" THEN  RETURN

1000 VZ =  VAL (Z$): IF VZ < 1 OR VZ > TR THEN  PRINT  CHR$ (7): GOTO 990

1010 A1 = VZ: CALL  - 958
1020  VTAB 12: INPUT "LAST ALARM TO DELETE #";Z$: IF Z$ = "" THEN  RETURN
1030 VZ =  VAL (Z$): IF VZ < A1 OR VZ > TR THEN  PRINT  CHR$ (7): GOTO 10
   20
1040 A2 = VZ:DA = A2 - A1 + 1:TR = TR - DA: CALL  - 958
1050  FOR NR = A1 TO TR
1060 RE$(NR) = RE$(NR + DA): REM  RENUMBERS ALARM STRINGS
1070  NEXT : RETURN
1080  REM   START SPEAK AND PRINT ALARM MESSAGE
1090  HOME : PRINT E$"O"
1100  PRINT ""
1110  INVERSE : PRINT "ALARM WENT OFF AT "T$: REM  PRINT COMPLETE DATE &
   TIME STRING
1120  FOR N = 1 TO 3: REM  MESSAGE REPEATS THREE TIMES
1130  PRINT E$"B";: PRINT AM$: PRINT E$"O": REM  PRINT AND SPEAK MESSAGE
1140  FOR W = 1 TO 8500: NEXT
1150  NEXT
1160  PRINT : PRINT : PRINT E$"B": PRINT "CLOCK WILL RE-START IN THIRTY S
   ECONDS.": PRINT E$"O"
1170  FOR W = 1 TO 30000: NEXT : REM  DELAY ALLOWS CURRENT MINUTE TO CHAN
   GE
1180  NORMAL : GOTO 1390
1190  REM   SUBROUTINE TO SET ALARM TIME*******
1200  HOME : PRINT "ENTER ALARM #"NR" (MONTH '99' EXITS)"
1210  VTAB 2: HTAB 1: PRINT "MONTH(1-12)":VT = 2: GOSUB 1580:MO$ = IS$:MO
    =  VAL (MO$): IF (MO < 1 OR MO > 12) AND MO$ <  > "**" AND MO$ <  >
   "99" THEN  PRINT  CHR$ (7): GOTO 1210
1220  IF MO$ = "99" THEN TR = NR - 1: POP : RETURN
1230  VTAB 3: HTAB 1: PRINT "DAY(1-31)":VT = 3: GOSUB 1580:DA$ = IS$:DA =
    VAL (DA$): IF (DA < 1 OR DA > 31) AND DA$ <  > "**" THEN  PRINT  CHR$
   (7): GOTO 1230
1240  VTAB 5: HTAB 1: PRINT "DAY OF WEEK (SUNDAY=0)"
1250  VTAB 6: HTAB 1: PRINT "DAY(0-6)":VT = 6: GOSUB 1580:WD$ = IS$:WD =
    VAL (WD$): IF (WD < 0 OR WD > 6) AND WD$ <  > "**" THEN  PRINT  CHR$
   (7): GOTO 1250
1260 WD$ =  RIGHT$ (WD$,1)
1270  VTAB 7: HTAB 1: PRINT "ENTER TIME:"
1280  VTAB 8: PRINT "HOUR(0-23)":VT = 8: GOSUB 1580:HR$ = IS$:HR =  VAL (
   IS$): IF (HR < 0 OR HR > 23) AND HR$ <  > "**" THEN  PRINT  CHR$ (7):
    GOTO 1280
1290  VTAB 9: HTAB 1: PRINT "MIN(0-59)":VT = 9: GOSUB 1580:MI$ = IS$:MI =
    VAL (IS$): IF (MI < 0 OR MI > 59) AND MI$ <  > "**" THEN  PRINT  CHR$
   (7): GOTO 1290
1300  HOME : INVERSE : VTAB 5: PRINT "ALARM WILL BE SET TO GO OFF"
1310  VTAB 6: PRINT "MONTH "MO$: PRINT "DAY   "DA$
1320  PRINT "WEEKDAY "WD$
1330  PRINT "AT:"
1340  VTAB 10: PRINT HR$;" HOURS"
1350  PRINT MI$;" MINUTES"
1360  PRINT "TOUCH 'RETURN' IF THIS IS CORRECT        OR ANY OTHER KEY TO
   RE-ENTER ALARM TIME ": NORMAL : GET Z$: IF Z$ <  > CHR$ (13) THEN  GOTO
   1190
1370 AL$ = WD$ + " " + MO$ + "/" + DA$ + "/ " + HR$ + "." + MI$
1380  RETURN
1390  REM  START ALARM RUNNING*****************
1400  HOME : PRINT "ALARM NOW RUNNING"
1410  VTAB 16: CALL  - 958: PRINT "PRESENT DATE AND TIME IS:": INVERSE
1420  VTAB 21: PRINT "TO EXIT TO MAIN MENU, TOUCH 'ESC'"
1430  VTAB 16: GOSUB 1760: PRINT T$: REM  GET DATE/TIME STRING AND PRINT
   IT
1440  FOR WS = 1 TO 850: NEXT : REM  DELAY TO CUT FLICKER
1450  FOR I = 1 TO TR
1460  REM   START TO CHECK CURRENT DAY,,HOUR,MIN. ETC. AGAINST EACH ALARM
    IN MEMORY
1470 AL$ =  LEFT$ (RE$(I),14):AM$ =  RIGHT$ (RE$(I), LEN (RE$(I)) - 14): REM
    SPLIT ALARM STRING INTO TIME & MESSAGE
1480  IF  RIGHT$ (AL$,2) <  >  MID$ (T$,15,2) AND  RIGHT$ (AL$,2) <  > "*
   *" THEN 1540: REM  MINUTE CHECKS?
1490  IF  MID$ (AL$,10,2) <  >  MID$ (T$,12,2) AND  MID$ (AL$,10,2) <  >
   "**" THEN 1540: REM  HOUR CHECKS?
1500  IF  MID$ (AL$,6,2) <  >  MID$ (T$,6,2) AND  MID$ (AL$,6,2) <  > "**
   " THEN 1540: REM  DAY OF MONTH CHECKS?
1510  IF  MID$ (AL$,3,2) <  >  MID$ (T$,3,2) AND  MID$ (AL$,3,2) <  > "**
   " THEN 1540: REM  MONTH CHECKS?
1520  IF  LEFT$ (AL$,1) <  >  LEFT$ (T$,1) AND  LEFT$ (AL$,1) <  > "*" THEN
   1540: REM  DAY OF WEEK CHECKS?
1530  GOTO 1080: REM  GOT A MATCH! GO TO SOUND ALARM
1540  NEXT : REM  BACK TO CHECK AGAINST NEXT ALARM STRING
1550 PK =  PEEK ( - 16384): POKE  - 16368,0: IF PK = 155 THEN  RETURN : REM
    SEE IF 'ESC' PRESSED
1560  GOTO 1430: REM  NO ALARMS CHECK WITH CURRENT TIME - GO BACK TO UPDA
   TE TIME
1570  GOSUB 1080: REM   TO SPEAK ALARM
1580  REM  START TIME INPUT SUBROUTINE WHICH ENSURES EACH SEGMENT OF STRI
   NG IS RIGHT LENGTH (2 CHRS) ETC.
1590 FL = 2:HT = 12
1600  INVERSE : VTAB VT: HTAB HT: FOR I = 1 TO FL: PRINT " ";: NEXT : VTAB
   VT: HTAB HT:IS$ = "":CN = 1
1610  GET CH$: IF CH$ =  CHR$ (8) THEN 1710: REM  BACKSPACE
1620  IF CH$ =  CHR$ (13) THEN 1680: REM  RETURN PRESSED
1630  IF CH$ =  CHR$ (24) THEN  PRINT  CHR$ (7): POP : NORMAL : GOTO 1190

1640  IF CN > FL THEN  PRINT  CHR$ (7);: GOTO 1610
1650  IF CH$ =  CHR$ (21) THEN 1740
1660  IF  ASC (CH$) < 48 OR  ASC (CH$) > 57 THEN  PRINT  CHR$ (7);: GOTO
   1610
1670 IS$ = IS$ + CH$: PRINT CH$;:CN = CN + 1: GOTO 1610
1680  IF CH$ =  CHR$ (13) AND CN = 2 THEN IS$ = "0" + IS$: GOTO 1700: REM
    IF ENTRY LESS THAN 10, ADDS A "0" IN FRONT
1690  IF CN <  = FL THEN  FOR I = CN TO FL:IS$ = "*" + IS$: NEXT : REM  I
   F NO ENTRY MADE, STRING IS SET TO '**'
1700  NORMAL : RETURN
1710 CN = CN - 1: IF CN = 0 THEN  PRINT  CHR$ (7);: GOTO 1600
1720  PRINT  CHR$ (8);: IF CN > 1 THEN IS$ =  LEFT$ (IS$,CN - 1): GOTO 16
   10
1730  GOTO 1600
1740 AS =  PEEK ( PEEK (40) +  PEEK (41) * 256 +  PEEK (36)): IF AS < 32 THEN
   CH$ =  CHR$ (AS + 64): GOTO 1670
1750 CH$ =  CHR$ (AS): GOTO 1670
1760  REM    GETS DATE/TIME STRING 'T$' FROM CLOCKCARD
1770  PRINT D$"IN#4"
1780  PRINT D$"PR#4"
1790  INPUT T$
1800  PRINT D$"IN#0"
1810  PRINT D$"PR#0"
1820  RETURN
1830  REM   START EXIT ROUTINE*****************
1840  HOME : VTAB 10: PRINT  CHR$ (7)"ARE YOU SURE YOU WANT TO WIPE ALARM
   S    COMPLETELY FROM MEMORY (Y/N)": GET Z$: IF Z$ = "Y" THEN  POP : PRINT
   D$"CLOSE": HOME : END
1850  RETURN
1860  REM   ERROR HANDLING ROUTINE*************
1870  PRINT D$"CLOSE": HOME : INVERSE : VTAB 10: PRINT  CHR$ (7)"SOMETHIN
   G IS WRONG - TRY AGAIN": PRINT : PRINT
1880  IF  PEEK (222) = 6 THEN  HTAB 10: PRINT "NO SUCH FILE"
1890  POKE  - 16368,0
1900  PRINT : PRINT : PRINT "TOUCH 'RETURN' TO GO BACK TO MENU": NORMAL :
    GET Z$: GOTO 110
```



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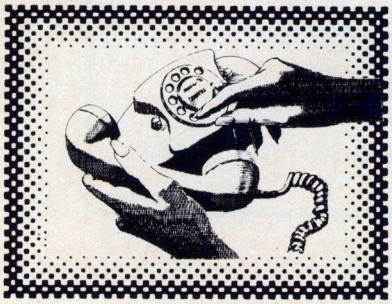

WHAT does your Apple do when you're not at the keyboard? Some folks have home security systems built around their computers; others have electric light and appliance control systems. Some have dedicated phone lines which they monitor for calls from other computers. But most people just turn their systems off, or leave them run at whatever point they were at when they walked away (usually a blinking cursor next to the Applesoft prompt). Yes, it really *is* better for your computer to run continuously than to be turned off between uses. When it runs continuously, it stays at a somewhat constant temperature, while most spontaneous semiconductor failures are the result of repeated expansion and contraction from warming and cooling. The less you turn it off, the longer it takes to go through a fatal number of thermal expansion cycles.

When I'm away from the keyboard, my Apple is monitoring the phone line on which humans call, ready to answer and take a message. Yours can do the same, if you have a Hayes Micromodem (or other modem with ring detect), a Mockingboard, and a cassette recorder. The only additional components you will need are a phone patch, a relay, and a few electronic parts. See the parts list (Table 1) for the full details. These additional items might cost you almost as much as a cheap answering set from a national electronics merchandiser, but the Apple-based system is much more reliable. And, if you have a real-time clock in your Apple, it will give you the added bonus of knowing when each call came in.

Hardware

It is best to set up the hardware first. You can test it in immediate mode, and once you know it works, it will be easier to track down typing errors in the program.

Step 1:

Start by ordering the phone patch. While you are waiting for it to arrive, you can get the rest of the system ready to go. The specified patch is available from Heath Company, Benton Harbor, MI 49022. As of this writing, the price tag is $59.95. If you can find a phone patch cheaper somewhere where else, take advantage of it! This is the type of device that is normally used for connecting Ham or CB radio equipment to the phone line; it has connections for "line," "receiver," "transmitter," and "speaker." Any such device should perform satisfactorily in this application.

Step 2:

Build the interface, shown in Figure 1, on a piece of perforated "breadboard." The parts arrangement is not critical; you may lay it out in whatever manner seems easiest to you. Just make sure the parts don't touch one another on the top side of the board. Make all connections on the underside. Bend the protruding component leads toward the other leads to which they are to be connected. Cut each lead so that there is a little overlap when they are pressed flat against the board, and carefully solder the leads together. Make sure that all excess wire is removed, and don't let unrelated connections touch. If you find that one connection's path crosses another, use insulated hookup wire to jump over the previous connection. Those who are inexperienced at soldering should practice with some scrap wire first, or get a friend to do the soldering. The Heathkit phone patch comes with good advice regarding the use of proper soldering techniques.

Place the interface in an enclosure of your choice. It can be as simple as a

Table 1

Quan	Description
1	Apple II, II+ or //e, equipped with at least 48K RAM and either ROM Applesoft or Language Card
1	Hayes Micromodem or equivalent
1	Mockingboard Speech I or Sound/Speech I
(1)	Mountain Computer AppleClock or equivalent (optional)
1	Cassette tape recorder with remote pause feature (usually activated by a switch on the microphone)
1	Phone patch, Heathkit HD-15 or equivalent (see Step 1)
1	Relay, 2 pole, 12V dc, Radio Shack 275-206 or equivalent (DPDT)
1	Perforated board, Radio Shack 276-1395 or equivalent
1	Silicon diode, 1A, 600V, Radio Shack 276-1104 or equivalent (1N4004)
2	Opto-Isolators, from Radio Shack assortment pack 276-1628, or equivalent (TIP-111)
2	NPN silicon transistors, Radio Shack 276-2017 or equivalent (2N2222)
2	Resistors, 1500 ohms, 1/4 watt
1	Capacitor, .01 microfarad, 100V minimum
?	Wires, connectors, cables, solder, etc. as required.

cardboard box or a plastic margarine tub, or it can be a fancy metal box with input and output connectors. Anything that keeps the interface's internal wiring out of trouble will do just fine.

Step 3:

Connect the interface to the computer. Most of the connections are made at the game paddle socket. If you like, you can have your paddles and your interface connected at the same time. Using #22 AWG or smaller wire, tap the paddle plug as shown in Figure 2. Use as little solder as possible, and be *very* careful not to create any shorts between the pins!

You'll also need a connection to the +12V pin at the internal 4-pin video connector; this provides power for the patch relay. If your Apple is out of warranty and you feel comfortable working with hardware, you may make this connection by carefully soldering a wire directly to the pin. Otherwise, it is best to obtain the required 4-pin Molex connector. This connector is identical to the one that connected the speaker cable to the early-production Mockingboard.

Step 4:

Install the relay inside the phone patch (which you now must have before you can continue). Figure 3 shows how to connect it in the Heath patch. The idea is to intercept the filtered phone line at its connection to the patch OFF-ON switch. Both sides of the line are switched through the relay; this provides the required isolation when the system is idle.

You will have to cut out an extra opening at the rear of the patch for an additional 2-terminal strip, or else drill 2 holes for feedthrough connectors. This is for the connection to the relay coil. You could let two insulated wires pass between the patch chassis and its cover, but you're dealing with your computer's power supply, and it is safer to go through some sort of connector. A grounded connector (such as a phono jack) should be avoided, as it has the potential to short out your Mockingboard's voice output! The Molex connector on the Mockingboard is easily installed backwards, which will result in a short circuit if the computer's ground bus is already connected to the patch chassis.

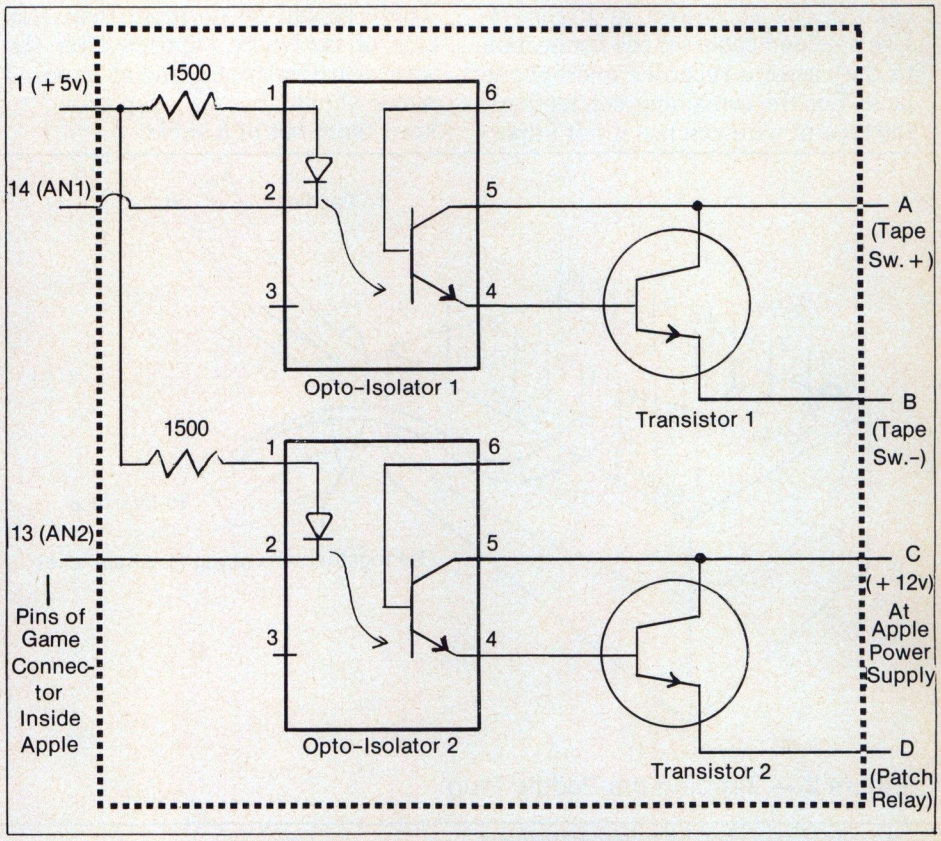

Figure 1 — Interface Schematic

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Step 5:

Make all of the external wiring connections as shown in Figure 4. Use shielded cable for the connection to the cassette recorder microphone jack. For the remaining connections, the type of wire you use is not important, as long as it is insulated. Do not strip the wires longer than necessary! There should be no more than 1/16 inch of bare wire exposed after the screws are tightened, and all exposed wires should be well-separated to keep them out of trouble.

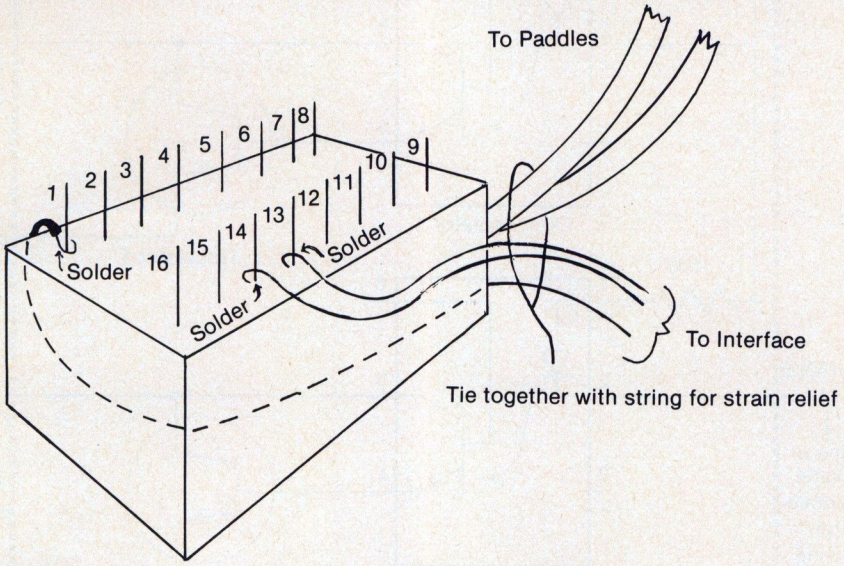

Figure 2 — Tapping the Paddle Plug

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Hardware Testing

Step 6:

Turn off the phone patch and run the SPEECH WRITER program (*Call -A.P.P.L.E.*, October 1983). Be sure to incorporate the "Speech Writer Enhancements" described in the accompanying article of the present issue. Compose a brief message which will tell your callers that you can't come to the phone, and ask them to leave a message within 20 seconds after the tone.

When you enter each line of speech, you should hear it through the speaker. If not, stop and check your connections to the Mockingboard and to the speaker. The word "tone" will sound much better if you spell it "tohn." After composing your message, save it to the disk under the name of TELEPHONE. Exit the program.

Step 7:

Now turn on the phone patch. Set the patch gain controls to about 70 percent of maximum. Place a blank cassette in the recorder and put it in RECORD mode. The tape should *not* be moving yet! If it is, first make sure you have plugged the interface cable into the remote switch jack on your recorder. Then double-check your connections to the game connector, and the construction of the interface itself. You might have installed a transistor improperly.

Step 8:

In Applesoft, type POKE-16294,0 and press RETURN. The tape should now be moving. Similarly, enter POKE-16292,0. You should hear the relay click inside the phone patch. If not, go back and check out your interface wiring. Polarity is important at both the interface and the patch relay; if it doesn't work, something might be connected backwards.

Step 9:

Plug an earphone into the cassette recorder's earphone connector. You should now hear a considerable amount of noise in the earphone. If you pick up the telephone, you should hear the dial tone clearly through the earphone. If not, check your connections to the phone line, the relay and the cassette recorder.

Step 10:

Dial a silent test line, if you know the number of one. Otherwise, you can dial your own number and listen through the busy signal. Run SPEECH WRITER (with enhancements) and load your TELEPHONE message. Have the computer recite the message. Adjust the patch RCVR GAIN control for a satisfactory deflection of the patch VU meter, but do not let it peak higher than the 80% mark. Under *no* circumstances should the meter ever go into the red area! If you are using a patch without a meter, listen to the telephone while adjusting either the patch or the Mockingboard's output level control. Make it sound a little loud, but without distortion. Now listen through the cassette recorder earphone and adjust the NULL control (on the back of the patch) to obtain the *weakest* possible voice. Go back to the telephone; the loudness should still be satisfactory. If not, readjust the RCVR GAIN control and/or the Mockingboard's output level control.

Step 11:

Exit SPEECH WRITER and enter POKE-16293,0. The tape should stop. Enter POKE-16291,0. The patch relay should click out. Hang up the phone; the hardware test is over! ***(Continued on page 24)***

Speech Writer *Enhancements*

Clay Ruth

THOSE of you who are using my Speech Writer program (*Call -A.P.P.L.E.*, October 1983) with your Mockingboards have probably noticed how hard it can be to get the Sweet Micro Systems text-to-speech algorithm to correctly pronounce the letter G. Also, as stated in the original article, Speech Writer runs out of memory in a hurry if you do a lot of deleting and inserting.

This article presents two enhancements which I'm sure you will want to make. The first is a modification of the algorithm, and the second is the incorporation of String Swap (*Call -A.P.P.L.E.*, January 1980). String Swap enables the string array elements to be reassigned (thereby changing the line numbers) without consuming additional memory. I am recommending that you make both modifications; this will result in a file called ALGORITHM+SWAP which contains all the algorithm files plus String Swap in one BLOAD.

First, BLOAD RULES2.OBJ from the Sweet Micro Systems text-to-speech algorithm disk, and run the phoneme rules editor program (this was called PRE2 on my copy). Enter S (to select a rule table), then enter G (to select the rules for the letter G).

You should now see a whole screen full of pronunciation rules for the letter G. The algorithm instruction manual tells you how to interpret them, but you don't have to understand how they work to make this modification.

Look for a rule defined by >"&= 011E1A which means, "The letter G followed by any vowel and then any consonant should be pronounced as DJ." On my copy, this was rule #11. This one rule makes "get" sound like "jet," and messes up a lot of other words that contain G. Somehow, it makes "go" sound like "joe," even though there is no consonant following the vowel. I decided I would rather have it use the G phoneme. When a J sound is desired, you can get it by spelling the word with J. To alter G-rule #11, enter the following series of commands:

```
C
11 [return]
>"& = 011C [return]
M
Y
A
Y
```

Exit the rules editor by pressing the escape key. Now your disk contains a new file, RULES2.BAK, which is the edited version of RULES2.OBJ. Make it part of a combined file as follows:

```
BLOAD T-S2.OBJ
BLOAD RULES2.BAK
BLOAD RNDX2.OBJ
BLOAD PHIDRV2.OBJ
CALL-151
3FE3:  20 E3 DF 85 85 84 86 20 BE DE 20
       E3 DF A0 02 B1 85 48 B1 83 91 85
       68 91 83 88 10 F3 60
3D0G
BSAVE ALGORITHM + SWAP,
A$3FE3,L$1F9D
```

If you are not already using the disk containing the Speech Writer program, switch to it and repeat the BSAVE command shown above. You are now ready to modify the Speech Writer program to take advantage of String Swap. Do this as follows:

```
LOAD SPEECH WRITER
DEL 120,150
120 PRINT D$; "BLOADALGORITHM +
    SWAP"
150 POKE 1013,76: POKE 1014,227:
    POKE 1015,63: REM SET &-
    VECTOR FOR STRING SWAP
6080 & TL$(LN + IL),TL$(LN)
8080 $ TL$(LN),TL$(LN + DL)
```

Now you can edit all you want without fear of clogging up memory with renumbered text lines. The only wasted string space will be that occupied by original lines that have been deleted. If you find yourself deleting lines from a lengthy speech, simply saving the revised speech to disk and reloading it will reclaim the space once occupied by the deleted lines. Additional lines can then be entered without wasting memory.

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Software

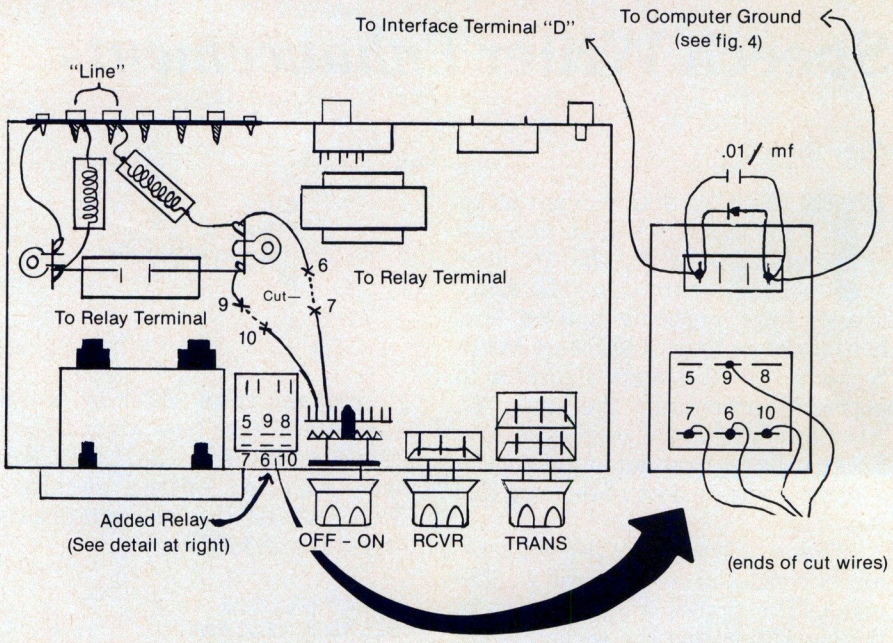
Step 12:

Make sure the computer's memory is clear by entering FP. Now, type in the program shown in Listing 1. Save it with the name of ANSWERING SYSTEM, or use a different name if you prefer.

The long REMark in line 25 may be broken down into separate REM statements, but it should not be omitted entirely. It serves as a handy reminder of what the variables in line 24 represent, in case you change your system configuration.

I keep my clock board set to Coordinated Universal Time (UTC or GMT). This is because I use it primarily for logging Amateur Radio activity. Also, by using appropriate adjustment factors for local time and daylight savings, I avoid having to reset the clock every spring and autumn. If your clock is on local time, simply use AF=0 and DS=0. If you don't have a clock, use CS=0 and it won't matter what AF and DS are.

Change the other system parameters in line 24 as appropriate, using line 25 as a guide. N is the default



Cut two existing wires where marked "X" above. Connect the cut ends to indicated terminals of the new relay.

Figure 3 — Installation of Relay

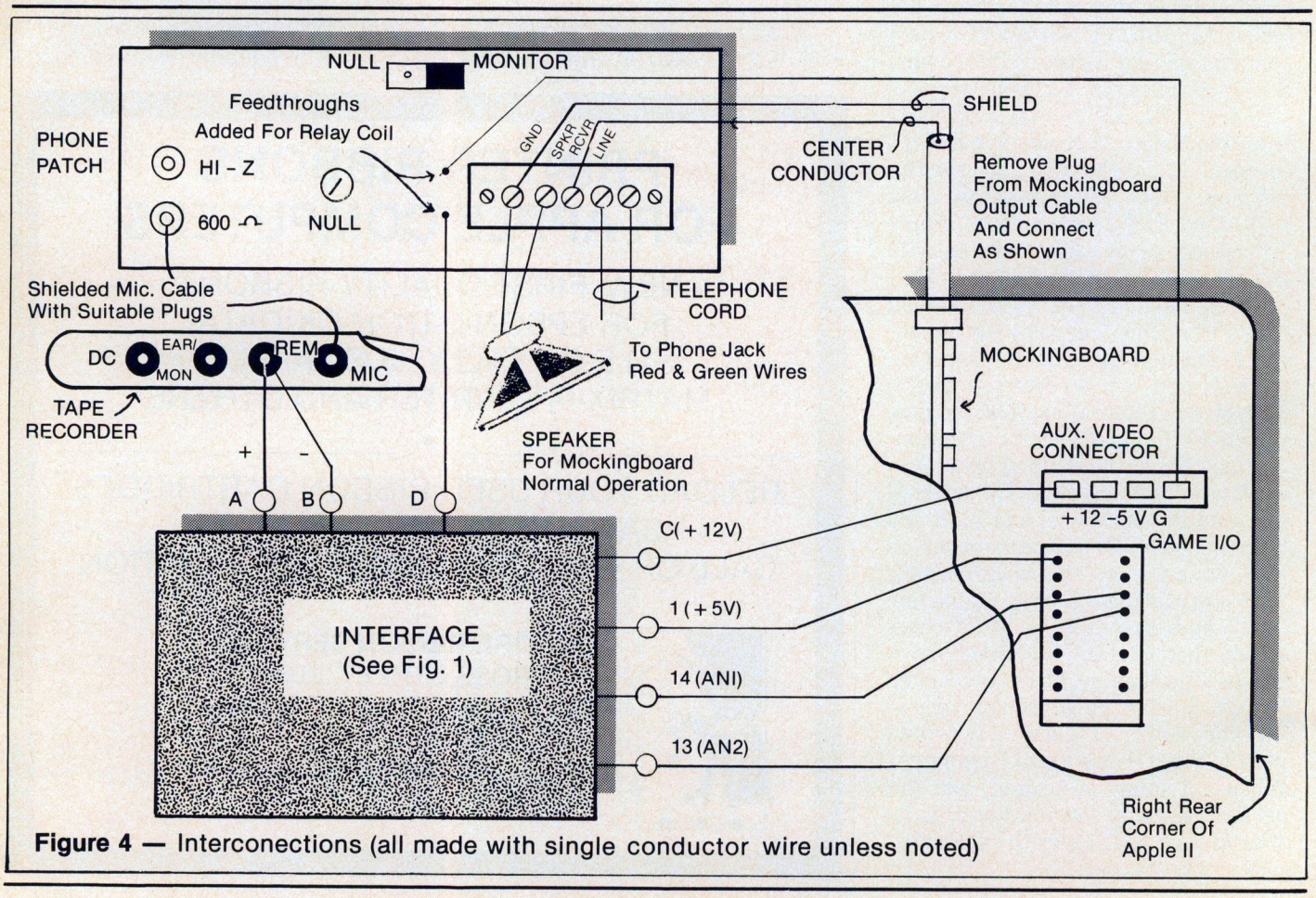


Figure 4 — Interconections (all made with single conductor wire unless noted)

number of rings after which the computer will answer the telephone. This is easily changed while the program is running, but initializing this variable with a commonly-used number helps make the program self-starting.

Line 50 BLOADs a file named ALGORITHM. If you have incorporated "Speech Writer Enhancements," you can change this to "BLOADALGORITHM+SWAP." If you haven't, create the file by running SPEECH WRITER, exiting the program, and entering BSAVE ALGORITHM, A$4000,L$1F80.

Lines 1120 and 1125 activate and initialize a printer card in slot 1. If you don't have a printer, you'll want to change the "PR#1" (in line 1120) to "PR#0". When you do this, append a REMark to explain that it gets changed back to "PR#1" when the printer is connected. If your printer automatically linefeeds upon receipt of a carriage return, line 1125 should prevent it from double-spacing. Otherwise, you may delete this line, or you may substitute a string of control characters which will put your printer into the desired mode. Those who use machine code driver calls should place the appropriate call on line 1125, and change the "PR#1" (in line 1120) to "PR#0".

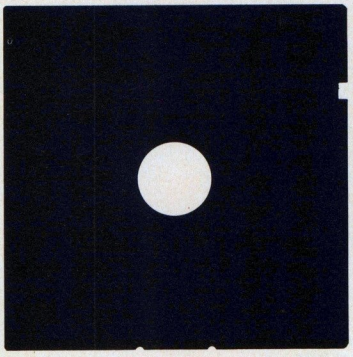
The main loop, from lines 130 through 220, is patterned after the program ANSWER ON NTH RING MODIFIED, which came with my Micromodem. The numeric variable ST, defined in line 120, is the address of the modem's status port. Lines 160 and 200 test this location; if the value found there is less than 128, the phone is ringing. If you are using a different modem, you may have to change lines 120, 160 and 200 to suit your modem's method of ring detection. Line 270 directly POKEs the modem status register with the proper value to pick up the phone (off-hook condition) without turning on the carrier; your modem may require a different instruction. You may also have to modify lines 320 and 340 to suit your modem.

Rings are counted in the variable R. As soon as the Nth ring is completed, line 210 diverts execution to the phone answering section. However, if the phone rings fewer than N times, the W loop times out (1300th execution of NEXT in line 170). The phone is not answered, but the number of rings and the time of day are printed for your information.

The same loop that tests for ringing also tests for a keypress in line 155. Pressing a key diverts flow to the "Interpret Keypress" section (lines 1000 through 1090). There, if the key is numeric, the value of N is changed to the number pressed, and the new number is printed for confirmation. If the key was ESC, the program stops. If it was T, the tape recorder is turned on for the message review (see "Operation"). There is plenty of extra space between lines 1010 and 1080 for you to add your own character tests, in case you have ideas for some additional features.

Line 350 controls the amount of time allowed for the caller's message to be recorded. The loop shown permits messages of up to 20 seconds.

Subroutines 1100 and 1300 read the clock and handle the string conversion. They are based on the Mountain Computer AppleClock, and will correctly extract the date and time



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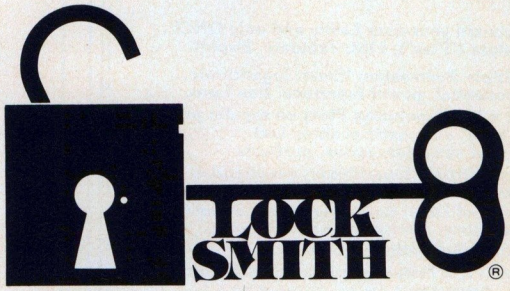

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Listing 1

```
A.P.P.L.E. Answering System

For use with Mockingboard
Speech I or Sound/Speech I
and Hayes Micromodem
and (optional) Apple Clock

by Clay Ruth,
Call -A.P.P.L.E. Staff Writer

1  LOMEM: 24448: PRINT  CHR$ (4);
     "MAXFILES1"
10 D$ =  CHR$ (4): PRINT D$;"NOMO
     NICO"
24 DS = 0:AF =  - 6:LY = 0:CS = 5
     :MS = 3:MB = 4:N = 4
25  REM

DS=0 for Standard Time
DS=1 for Daylight Time

AF=-5 (EST), -6 (CST),
   -7 (MST), -8 (PST)

AF=0 if clock on local

LY=1 for Leap Year

CS=Clock Slot (0=none)
MS=Modem Slot
MB=MockingBoard slot

N=Number of Rings

30  PRINT D$;"IN#0"
40  PRINT D$;"PR#0"
45  TEXT : HOME
50  PRINT D$;"BLOADALGORITHM"
51  POKE 1022,161: POKE 1023,67: POKE
      25,0: POKE  - 16293,0: POKE
      - 16291,0
55  GOSUB 4000: REM  Load speech
90  GOSUB 1120: REM  Printer on
100  PRINT "Waiting for ring #";N
     ;" : ESC = quit  "
120 ST =  - 16251 + 16 * MS
129  REM

Main Loop - Wait for Ring

130 R = 0: REM
Initialize ring count
150  FOR W = 1 TO 1300
155 IN% =  PEEK ( - 16384): IF IN
     % > 127 THEN 1000
160  IF  PEEK (ST) < 128 THEN 180
     : REM
Test for ringing
170  NEXT : IF R THEN  GOSUB 1200
     : REM
Display ring count and time
175  GOTO 130
180 R = R + 1: REM
Increment ring count
200  IF  PEEK (ST) < 128 THEN 200
     : REM
Wait for ring to end
210  IF R >  = N THEN 230: REM
Answer phone
220  GOTO 150
230  GOSUB 1100
240  INVERSE : PRINT "ANSWERED AT
       ";T$: NORMAL
245 VT =  PEEK (37) + 1
250  PRINT D$;"PR#";MS
260  PRINT
270  POKE ST,136: REM
Off-hook, no carrier
280  POKE  - 16292,0: REM
Connect patch
290  GOSUB 2210: REM
Recite message to caller
300  FOR X = 1 TO 400: NEXT
310  POKE  - 16294,0: REM
Start tape
320  POKE ST,142: REM
Send answer carrier
330  FOR X = 1 TO 900: NEXT
340  POKE ST,136: REM
Turn off carrier
350  FOR X = 1 TO 20000: NEXT
360  POKE  - 16293,0: REM
Stop tape
370  POKE  - 16291,0: REM
Disconnect patch
450  PRINT  CHR$ (26): REM
Hang up (modem on-hook)
460  VTAB VT: CALL  - 958: REM
Pack screen display
490  GOTO 130
999  REM

Interpret keypress

1000  POKE  - 16368,0: IF IN% > 1
      76 AND IN% < 186 THEN N = IN
      % - 176: GOTO 90
1010  IF IN% = 212 THEN 5000
1080  IF IN% <  > 155 THEN 160
1085  PRINT D$;"PR#0": PRINT D$;"
      IN#0"
1090  END
1099  REM

Read Clock (if present)

1100  IF  NOT CS THEN T$ = "UNDET
      ERMINED TIME": GOTO 1120
1105  PRINT D$:"PR#":CS: PRINT D$
      ;"IN#";CS
1110  INPUT " ";T$: REM Read cloc
      k
1115  GOSUB 1300: REM
Convert string
1120  PRINT D$;"IN#0": PRINT D$;"
      PR#1"
1125  PRINT  CHR$ (9);"K";: REM
Delete line 1125 if printer
doesn't automatically linefeed
1130  RETURN
1200  GOSUB 1100
1210  PRINT R;" rings at ";T$
1220  RETURN
1299  REM

Convert clock output to
desired format, including
adjustment for local time

1300 PM = 1: REM
Initialize AM/PM flag
1310 T =  VAL ( MID$ (T$,7)) * 10
     0 +  VAL ( MID$ (T$,10))
1320 D =  VAL (T$) * 100 +  VAL (
      MID$ (T$,4,2))
1330 T = T + (AF + DS) * 100: REM

Adjust for local time
1340  IF T < 0 THEN T = T + 2400:
      D = D - 1: IF  NOT (D - 100 *
       INT (D / 100 + .05)) THEN D
       = D - 100:M =  INT (D / 100
       + .05):D = D + 31 - (M = 4 OR
      M = 6 OR M = 9 OR M = 11) -
      3 * (M = 2) + LY + 1200 * (M
       = 0): REM
Date correction
1350  IF T < 1200 THEN PM = 0: REM

AM/PM flag correction
1360  IF T < 100 THEN T = T + 120
      0: REM
Zero Hour = 12 AM
1370  IF T > 1299 THEN T = T - 12
      00: REM
13 - 23 hours become 1 - 11 PM
1380 T$ =  STR$ ( INT (T / 100 +
      .05)) + ":": IF T - 100 *  INT
      (T / 100 + .05) < 10 THEN T$
       = T$ + "0"
1385 T$ = T$ +  STR$ (T - 100 *  INT
      (T / 100 + .05)): REM
Time-string for display
1390  IF PM THEN T$ = T$ + " PM":
      GOTO 1410
1400 T$ = T$ + " AM"
1410 T$ = T$ + " ON " +  STR$ ( INT
      (D / 100 + .05)) + "/" +  STR$
      (D - 100 *  INT (D / 100 + .
      05)): REM
Append date to string
1420  GOSUB 4190:T$ = "" + T$: REM

Clobber garbage
1490  RETURN
1999  REM

Recite Speech

2210  FOR LN = 1 TO TL
2215  GOSUB 4190
2220 MB$ = TL$(LN)
2230  CALL 16800: CALL 17280
2240  ON  PEEK (25) = 255 GOTO 22
      40: NEXT
2290  RETURN
3999  REM

Load text from disk

4000 N$ = "MOCK.TELEPHONE"
4040  PRINT D$;"OPEN";N$
4050  PRINT D$;"READ";N$
4070  INPUT TL
4075  DIM TL$(TL)
4080  FOR LN = 1 TO TL
4090  INPUT TL$(LN)
4100  NEXT
4110  PRINT D$;"CLOSE"
4180 SL% =  PEEK (111):SH% =  PEEK
      (112): RETURN : REM
Remember string space pointer
4190  POKE 111,SL%: POKE 112,SH%:
      RETURN : REM
Reset string space pointer
4999  REM

Enable tape for play/rewind

5000  GOSUB 1120: REM  Printer on

5010  PRINT "Tape enabled. Press
      RETURN to resume."
5020  POKE  - 16294,0: REM
Tape on
5030  INPUT "";N$
5040  POKE  - 16293,0: REM
Tape off
5050  GOTO 100
```

from any clock which is AppleClock compatible. First, the time and date are extracted and converted to numeric variables in lines 1310 and 1320, respectively. Next, line 1330 applies the time zone and daylight savings corrections. Line 1340 checks to see if the correction factor crossed a midnight boundary. If so, it adjusts the date accordingly. Then, line 1350 sets the AM/PM flag, and lines 1360–1370 convert the 24-hour time value to the equivalent 12-hour value. Finally, lines 1380 through 1410 convert the numeric data back to strings, which are concatenated into the desired format. Your clock may require changes in lines 1310 and 1320.

Since concatenation creates a ton of garbage, line 1420 applies the Selective String Preservation technique (*Call -A.P.P.L.E.*, August and November 1982) to wipe out the garbage while preserving the desired result. The result is not protected, though, for it too will be garbage after it is printed. The next time the phone rings, it will be scrapped in favor of new material. This program can run forever without ever going into the garbage collection mode.

Operation

The Answering System Disk

The A.P.P.L.E. Answering System is designed to be self-starting. If you let it be the greeting program on a disk, you can simply insert the disk in the drive and turn on the computer and the printer. When the disk boots up, the program will automatically begin monitoring the phone line and the printer will display the target ring count. You don't even have to turn on your monitor! (Although continuous operation is good for solid-state components, it is not so good for CRT's.) If you leave the Answering System disk in the drive, it will even restart itself after a power outage (assuming you are using the autostart ROM).

You can make ANSWERING SYSTEM become the greeting program in three ways. First, you can LOAD the program from the disk on which you originally saved it, and then initialize a new disk by entering INIT ANSWERING SYSTEM. A second method is to delete the existing HELLO program from your disk and enter RENAME ANSWERING SYSTEM,HELLO. Third, you could revise your existing HELLO program by turning it into a one-liner:

```
10  PRINT CHR$(4);"RUN ANSWERING SYSTEM"
```

The first method is the one I used. I also keep a copy of SPEECH WRITER on the same disk, for easy updating of my phone message. The third method offers the greatest flexibility. Whichever method you use, be sure to include the text-to-speech algorithm and the telephone message on the same disk!

If you are using the original Apple II (Integer Basic in ROM) with Applesoft in the Language Card, you will want to use a modified form of the third method. Assuming that you already have the Answering System program, the telephone message, and the algorithm on a disk containing your ordinary HELLO program, do the following:

1) Place your DOS 3.3 System Master in the drive, and LOAD APPLESOFT.
2) Enter 310 PRINT "RUN ANSWERING SYSTEM" and be sure to include a [Ctrl-D] between the first quotation mark and the word RUN.

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10K More Memory

Use HIDOS command in hello program for turnkey startup, adding 10K free memory to run 30% larger Applesoft programs than ProDOS. Moves DAVID-DOS II and 4 buffers above main memory.

Ultra-Fast Garbage

New FRE command collects a memory full of 6000 strings that are half garbage in two seconds. DOS 3.3 takes 12 minutes. FRE is so fast it is not noticeable during run of most programs.

Clock Dating

Automatic date stamping of disk files is set up for 6 kinds of clocks or Hello manual date entry. New DATE command will auto-insert date in correspondence.

All times in seconds. (Time Test programs available)		DAVID DOS-II	ProDOS	DOS 3.3
TEXTFILES (100 Sectors)	TSAVE	8.0	NO	NO
	TLOAD	6.2	NO	NO
(791 Strings,	WRITE	29.3	28.0	88.4
32 chars ea)	READ	24.3	16.3	83.8
	PRINT/READ	44.2	45.9	117.1
(442 Sectors, 7 x 500)	APPEND	142.3	142.9	1231.2
APPLESOFT (100 Sectors)	*SAVE	6.4	16.4	33.1
	LOAD	5.0	4.0	23.5
INTEGER (100 Sectors)	*SAVE	6.6	NO	33.4
	LOAD	4.9	NO	23.4
BINARY (100 Sectors)	*BSAVE	7.3	18.4	28.7
	BLOAD	5.8	4.8	24.5
48K PROGRAM SPACE	APPLESOFT	36,352	NO	36,352
(With 3 Bufs avail)	INTEGER	36,352	NO	36,352
	BINARY	36,352	34,816	36,352
64K PROGRAM SPACE	APPLESOFT	46,592	32,256	35,756
(With 4 Bufs avail)	INTEGER	46,592	NO	35,756
	BINARY	46,592	41,728	35,756

*Add 5 seconds for Verify. Apple II, Applesoft & ProDOS are trademarks of Apple

Ten New DOS Commands

1. HIDOS moves DOS above 48K memory.
2. FRE makes ultra-fast garbage collection.
3. DATE stamp files. Clock or manual dating.
4. TLOAD speed loads all Text Files to mem.
5. TSAVE speed saves Text Files from memory.
6. TLIST lists all Text Files to screen/printer.
7. DUMP Binary/Ascii to screen or printer.
8. DISA disassembles Binary to screen/printer.
9. AL prints program Address & Length.
10. / is a one keystroke Catalog.

Identical Operation

All new commands operate identical to old DOS commands on the keyboard & in programs.

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Install DAVID-DOS II on your full disks in three seconds without touching the programs. Create bootable high-speed new disks with a Basic, Binary, or Exec Hello & 35/40 tracks. Create Data-Disks with 30 extra sectors.

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Circle 67 on Reader Service Card

3) Switch to your Answering System disk, and UNLOCK HELLO.
4) SAVE HELLO and LOCKHELLO.
5) Switch back to the System Master and BRUN FID.
6) Use FID to copy the FPBASIC file from your System Master to the Answering System disk.

Use of the above procedure will permit the Answering System disk to self-start by first loading Applesoft into the Language Card upon cold booting.

Check the Controls

Make sure the modem and phone patch are plugged into the telephone jack. Turn the patch to the ON position. Double-check the settings of the patch gain controls to make sure they are still where you set them during the hardware test. Place a cassette tape in the recorder and put it in RECORD mode. Finally, make sure the printer is on-line.

Boot Up and Select Ring Count

After booting up the Answering System, you can change the number of rings it will count before answering. Simply press any numeric key from 1 to 9. Zero will be ignored, as will any other characters except ESC and T. Each time you press a number, the printer will acknowledge by printing the new value.

Later...

To review the recorded phone calls on your tape, press T. The printer will acknowledge this keypress by informing you that the tape has been enabled. You will also notice that your cassette recorder is now running. You can operate its controls in the normal manner to rewind the tape and listen to your messages. When finished, start recording again and press RETURN. The printer will again acknowledge by printing the number of rings. It is ready and waiting for the next call.

To Quit

When you want to use the computer for other purposes, press ESC to exit the program. This will disconnect the output hook to the printer and will leave you in immediate-mode Applesoft. Resuming the program is a matter of simply rebooting the Answering System. I usually wait until after I have turned off the monitor before I reboot, for the act of turning it off has, on rare occasions, caused a glitch that made the computer hang.

Should you wish to use the Mockingboard through its speaker, it will be necessary to turn off the phone patch. Just don't forget to turn it back on the next time you reboot the Answering System! This is a leading cause of blank tapes and baffled callers!

When booting other programs, it is a good idea to turn off the tape recorder. The Apple's reset cycle (initiated by the reset key or by powering up) activates the output associated with the tape. Make sure the tape has not run out before you restart the Answering System.

Functional Test

Now that the Answering System is connected and running, take a walk to your neighbor's home (or a nearby phone booth) and call home. The computer should answer after the 4th ring (or whatever number you last pressed). Observe the loudness of the Mockingboard's voice on the phone. After the tone, talk in a normal tone of voice, or a little softer. Then go home and review the tape. The recorded level should be satisfactory, for most portable cassette machines have an automatic level control which is very forgiving of the setting of the patch TRANS GAIN control. If the recording is not satisfactory, adjust this control accordingly. If the Mockingboard sounded too weak on the phone, increase the patch RCVR GAIN slightly. Remember, this patch was designed for use with radio equipment; RCVR refers to a radio receiver, not the telephone receiver! The Mockingboard is performing the "receiver" function for the patch.

Choosing a Ring Count

The choice of 4 rings for a default value was not an arbitrary one. I monitored the phone line for several months, using a stripped-down version of the Answering System program, which merely displayed ring counts all day long. I found that most callers hang on for at least 4, and usually 5 rings. Occasionally, a persistent caller will wait for 7 or 8 rings. On the other hand, when we were home, we always answered within 2 or 3 rings. Having the computer answer on the 4th ring allows the use of one setting regardless of whether we are home or away. Very few calls are missed, and when we are home but busy, we can ignore the phone and let the computer get it. When we know we won't want to be bothered, a press of 1 or 2 is all it takes to minimize the ringing of the telephone.

You should select a ring count that is 1 or 2 rings more than it normally takes you to answer. Then, if you frequently find displayed ring counts that didn't get answered, reduce the target value accordingly. If you find your ideal ring count to be something other than 4, change the default value in line 24.

Refining the Message

Think about how the computer sounded when it answered your call. Was it clearly understandable? Remember, you are accustomed to the "Mockingboard accent," but your callers are not. What sounds perfectly clear to you may be mud to someone else! Ask a friend or relative who is unfamiliar with the Mockingboard to

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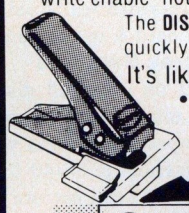

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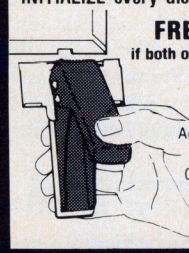

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Circle 68 on Reader Service Card

call it and give you a candid opinion.

My original message was much too wordy. Many people complained that they could not understand it; they even offered opinions regarding what it seemed to have in its mouth! Keep it brief and to-the-point. Choose words that the board pronounces clearly. Often, even the sequence of words makes a difference. Experiment with different versions of your message until you find the one that produces the fewest complaints. You will appreciate the flexibility afforded by the use of SPEECH WRITER files instead of hard-coded messages!

Mockingboard Improvements

I obtained my Mockingboard during the January, 1983 special offer from A.P.P.L.E. This was an early-production model, and some improvements have since been made in the speech quality and background noise level. If your board contains a 4050 chip and has two small capacitors mounted on the foil side, it is up-to-date as of this writing. However, if it has a 4049 chip, or it lacks the capacitors, you should contact the manufacturer about having it updated. The 4050 gives it a much more natural-sounding voice, and the capacitors virtually eliminate the noise which used to emanate from the speaker during idle periods.

Demo

Having read this far, you are apparently interested in the A.P.P.L.E. Answering System. You can hear it in operation by calling (219) 865-6165. This is a good opportunity for those who don't yet have the Mockingboard to hear a sample of its synthesized voice. If you call during normal weekday business hours, chances are pretty good that the computer will be answering the phone anyway. Just do me one small favor: tell the computer who you are! It is very disappointing to come home to a tape full of clicks and dial tones. If you catch me at home, I can still activate the system for you to hear. Should the phone keep ringing and never be answered, either something disastrous has happened, or my wife played a game when I wasn't looking!

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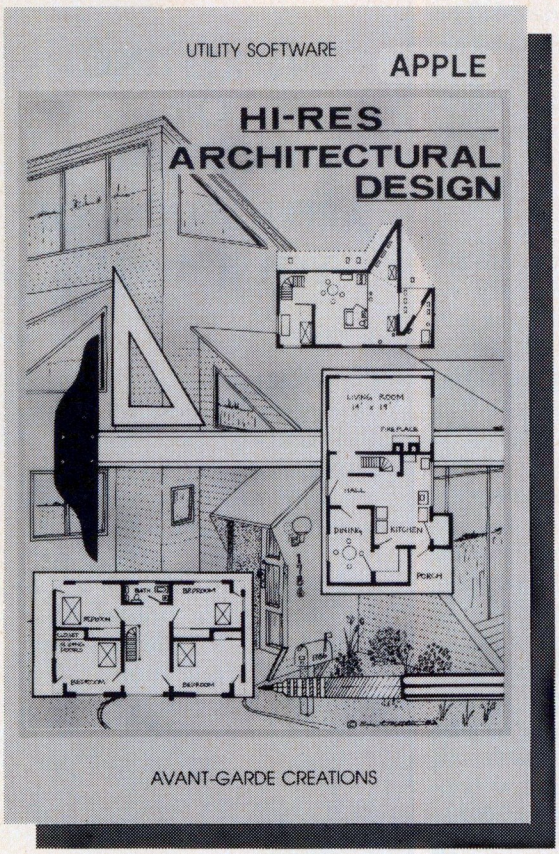

Hi-Res Architectural Design

Product:	Hi-Res Architectural Design
Use:	Design Utility
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Price:	$29.95

Lee Webster

IF you are planning to build a new house, remodel an existing one, or just rearrange furniture in your existing home, here is a software package which you might use to make drawings of the floor plan.

On booting, you are presented with a menu which allows you to: draw a plan, delete a plan, print, catalog a disk, insert extra labels (text on the drawing), save plan, get plan from disk, erase the screen, view the screen, or choose scales for the screen and for the predefined shapes.

When you select the draw option, you are presented with a screen that has 3 text lines at the bottom. Six items of data are included in these lines: up/down, sideways, diagonal, angle, 90–angle, and scale. These give continuous readouts of the distances and orientation of places on your drawing. For example, if you set the horizontal scale at 100 from the main menu, then a line half way across the screen will be 50 units long (you decide whether the scale is in feet, meters, or fathoms!). As you indicate two points on the drawing, the readings at the bottom of the screen will give you the horizontal distance, vertical distance, diagonal distance, and the angle of a line between the two points. This helps you get the scaling approximately right. I say "approximately" because you locate points by using the game paddle knobs (or, optionally, a joy stick—but I found the paddle easier to use for this program). My 1978 vintage paddles are not too reliable in trying to select a precise point on the screen to get the exact distance, but it will be close enough for the type of drawings one is likely to do with this program. Also at the bottom of the screen are indicated "90–angle" (the complement of "angle"), and "scale", which indicates the number of units horizontally across the screen.

Line drawing is simple enough. Position the cursor at the starting point (again you can use the values at the bottom of the screen to help since there is no visible grid) and press the period (.) key. Then move the cursor to the other end and press an appropriate key. You have a choice of keys to give you either a thin line, a thick line (filled in line useful for showing walls), a dotted (not dashed) line, or a thick line with sharp corners (even better for doing walls). It is very quick and easy.

Now, for the standard shapes and symbols needed in architectural drawings, you can choose from 76 predefined shapes. This is done by pressing ESC and entering the number of the shape you want. The shape appears on the drawing at the cursor position, but you can move it anywhere you wish. You can even rotate it (in 90–degree increments) by pressing any key. When it is located where you want it, press the SPACE BAR. Some shapes are very common, and there is a faster method of accessing them—just press a single letter key. For example—for a bathtub, press B; for a rectangle, press R. There are 26 such symbols, which mostly duplicate those accessible by number. A few of the shapes are predefined at 45–degree angles, giving you 8 possible orientations.

Erasing a symbol can be done by toggling the DRAW/XDRAW option, calling up a symbol, positioning it over the one already drawn, and pressing the space bar to "re-

draw" it in black—effectively erasing it. It is possible to draw lines in hi-res colors. To erase larger areas, there are symbols for "medium, large, huge" squares for erasing. This type of erasing is more difficult and a pixel-level erase would be useful.

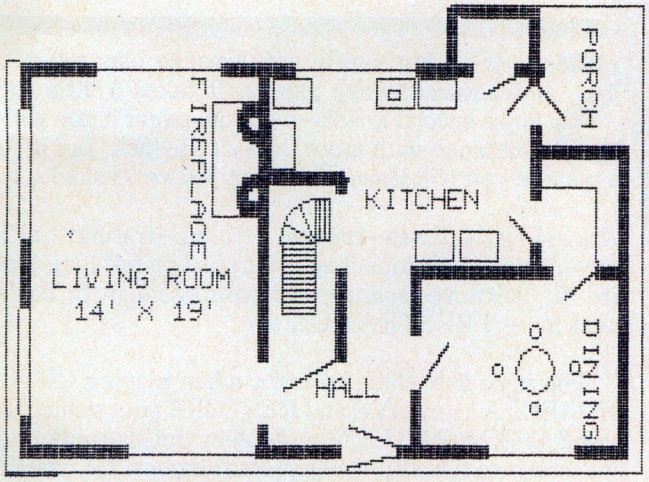

Figure 1 — Floor Plan done with Hi-Res Architectural Design Software

To enter text (titles, dimension notes, etc.) on your drawing, you must return to the main menu and select "Insert Extra Labels." You can then select horizontal or vertical lettering and type in the text (all caps). You are returned to the drawing screen where the text is displayed and you use the paddles to position it on the drawing. This is a little cumbersome (slow) as the text is "painted" on the screen one letter at a time, then erased one letter at a time (starting from the first). You don't immediately see the result of your repositioning until it is "repainted." Precision location of a text line can be tedious. The symbol for feet (') , inches ("), degrees, and a small "m" for meters are available for text notes.

The package comes with a 5½" x 8½" staple-bound, type-set manual with a short tutorial plus a listing of the commands. It seems to be adequate, since the program is easy to use. Also included is a reference card showing the 76 pre-defined symbols and their numbers along with the other commands.

Problems? There are a few. Once the horizontal scale is set and you return to the scale option, the instructions say that hitting RETURN will retain the current scale. This didn't work—I had to enter a new value before the program could return to the main menu. Also, when you choose to erase the screen, you are left with a completely blank (black) screen and need to press a key to get back to the main menu. It would be better if the main menu was redisplayed automatically.

This is a useful package, if you need to do this type of drawing. Figure 1 shows an example (included on the program disk) of a drawing made with the system. It would be nice to have printer drivers included and to be able to add your own symbols to the program. According to the documentation, Avant-Garde has extra-cost software to do this, but is it not part of the package. Overall, it does what it is advertised to do, and at a reasonable price.

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Circle 71 on Reader Service Card

Crypt of Medea

Larry Neibauer

Welcom

SLOWLY but surely you learn to play these... adventure/fantasy games. It takes a little time and a special knack—a special talent if you will—combined with more than a little luck. But if you persevere you will learn, and once you've learned...

DEFINITION: **Frus–trate** *v.* –trated, –trating. 1.a. To prevent from accompishing a purpose or fulfilling a desire. b. To cause feelings of discouragement or bafflement in. — FRUSTRATION *n.*

The very first thing to learn when playing CRYPT OF MEDEA is to SAVE and RESTORE your game. Just type SAVE, hit RETURN, and follow the instructions on the screen to save up to 9 different games. Or, you can type RESTORE, hit RETURN, and follow the instructions to restore your game to its *pre*–post–mortem state. Believe me! If you get as far as the laboratory, you'll want to *save your game before you do anything or go anywhere!* Then *continue* to save your game each and every time you attempt to do something brave (stupid?)—unless, of course, you enjoy exploring the same pathways over and over again.

In tradition with the movies *Friday the Thirteenth* and *Halloween*, the adventure game, CRYPT OF MEDEA, written by Allan Lamb and Arthur Britto, is not one for those with weak stomachs or overly vivid imaginations. It's a long, blood–smeared journey from beginning to end, with severed heads and hands, maggot covered corpses and many, many deadly traps. CRYPT OF MEDEA will talk during the play of the game if you use the optional Mockingboard. It also plays many short tunes appropriate to the action which, should you be playing in the wee hours of the morning, can be toggled off so as not to awaken the living...or the dead.

The manual presents the scenario for CRYPT OF MEDEA as follows..."As you drive the narrow and tortuous road, you feel an eerie sense of uneasiness. There is something about this night that does not seem right, but you find it hard to put your finger on it. The sky is clear and cloudless, stars upon stars fill the sky, the moon glows with a mysterious aura, yet strangely enough, it is still very, very dark. As a matter of fact, it's so dark that it's becoming increasingly difficult to see the road.

"Suddenly it dawns on you that you are peering intently through your windshield... *Wait*! What was that? You are almost positive that you saw something – you're not sure what, a flash or movement by the side of the road. You begin to take quick, furtive glances around, hoping to catch a glimpse of whatever it was. Finally, you begin to think it was your imagination—too many movies maybe. As you look back toward the road you are stunned by something...something terrible, shimmering grotesquely in the road! You hear yourself scream as you slam on the brakes.

Product:	Crypt of Medea
Description:	Adventure Game
For:	Apple II family
Company:	Sir-Tech Software, Inc. 6 Main Street Ogdensburg, New York 13669
Includes:	Diskette and manual
Price:	$34.95

"You feel dampness around you and a haunting silence fills your mind. You wonder where you are but you hesitate to look around. Well, better get it over with. As you open your eyes, you're stricken with an unfamiliar sight. Are those tombstones on the walls? You realize

e to the Crypt of Medea. . . We've Been Expecting You. . .

that you must be in a crypt or mausoluem. How did you get in here and how do you get out? Is that a door over there? You scamper hurriedly with a hint of panic in your step. Wait! Where's the latch? You realize with a sinking feeling why there wouldn't be a latch. . .

. . . THE DEAD HAVE NO NEED TO GET OUT!. . . "

You are faced with two problems. The first is to stay alive. The second (and probably the most challenging) is to get out of the CRYPT OF MEDEA. There are over 45 rooms and secret passages to find, search, and journey through. Scattered throughout these rooms are nearly 60 different objects, some visible and some. . . well, some . . . you're really going to have to work for.

Dabbling with a couple of other definitions, I discovered some subtle differences between a *hint* and a *clue*. A hint is not a clue, and SIR-TECH provides a few hints in the manual. If you really get stuck, there is a page with a series of coded clues. For those who become truly *frustrated*, here are a few tips. (A *tip* is a hint of a clue.) For those of you who want to do it entirely on your own, more power to you! Just skip the following *Tip* paragraphs.

Tip #1—LOOK and SEARCH do not mean the same thing. The authors threw us a curve on this one. It is possible to look, and see one thing, while searching may (or may not) uncover an important object needed to continue the game.

Tip #2—Be sure to read all of the information provided on the text screen. (Press any key to activate the text screen, and press ESC to re-activate the graphics screen.) The text screen will give you a brief description of where you are, a list of visible objects, and a list of visible exits/entrances. All exits/entrances are *not* visible on the graphics screen and I passed more than one important object neatly concealed in a hidden room simply by not reading the text.

Tip #3—There will be times when you have used an object and no longer need it. When you are sure that you no longer need it, drop it. I can think of at least two instances where dropping an object (or objects) becomes a matter of life and death.

Tip #4—For the most part, speed is of little consequence. However, there will be times when speed in thought *and* typing ability plays a very important role.

You should have little trouble getting out of the first three rooms—the manual provides this information in tutorial fashion. From there, it's strictly a matter of survival.

As for myself? I enjoyed the authors' challenge and spent many hours in an effort to free myself of MEDEA'S imprisonment. I found the ending a bit disappointing, having been left with the same feeling you get when a movie ends twenty minutes before it should. Whether the fault lies in the game, or whether I was disappointed from finally having beaten it, I'm not sure. At any rate, I would not hesitate to recommend this game to anyone who enjoys adventure and the thrill of a great, spine-tingling challenge.

. . . Medea appears before you. She is unbearably beautiful. She holds a blood covered weapon in a strange basket . . . she asks you, "Will you give me your soul?".
Did I?. . . I won't say.
Would you?

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THE COMPUTING TEACHER

Journal of The International Council for Computers in Education

- Computers in Elementary Education
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- Computers in High School
- Computers in Teacher Education

The Computing Teacher, published nine times a year, August-May, is a journal for precollege educators who are making instructional use of computers or who are concerned with how computers are affecting the content and process of education. Each issue contains information of use to the beginner as well as to the more experienced computer user. TCT features articles, software reviews, book reviews, film reviews and special columns, including Computers in the Teaching of English, The Logo Center, Computers in Science Education and Computers in the Arts and Humanities.

The Computing Teacher is the journal of The International Council for Computers in Education, a non-profit, tax-exempt professional organization. ICCE has members from every state in the United States, six Canadian provinces, and from over 60 other countries. ICCE is dedicated to helping teachers learn about computers in education and to improving education at all levels.

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Lee Webster

WITH all that "educational" software out there, it's nice to write about a package that I actually like enough to use! The "Simulated Computer" program has been a part (about one class period) of an introductory course in computer programming and applications. I like to discuss what is really going on inside the computer at the "gut" level (machine language) without having students write machine language (after all, it is only an introductory course for majors).

This program came on an unprotected diskette, with a small 14-page manual. Let's begin by looking at the software. On booting the disk, you get the usual advertising message/logo, and a chance to have the instructions displayed on the screen in text mode. Most of this instructional material is also in the Appendices of the manual, but it is nice to have it "on line" from the disk if you should need it. Having an unprotected disk is also nice—it is absolutely essential to make back-up copies when using programs in the educational environment. You never know what a student (or instructor) might do to a diskette! As a bonus, EduSoft has a Site License program, meaning that for a fee of $35 per software package, the licensee is allowed to make one copy for each computer at the site, or load it onto a hard disk. The

licensee also receives 5 sets of documentation. As indicated in the catalog, "...the fee is low and enables you to set a fine legal and ethical example for your students." The extra sets of documentation "...ensure that each student knows his software wasn't 'pirated'"'—an excellent approach which should be commended!

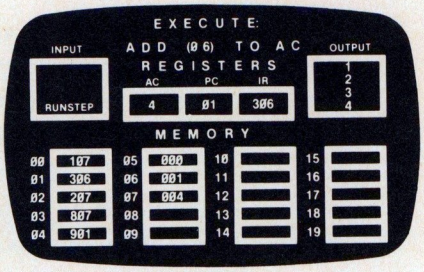

Figure 1

The purpose of the software is to simulate the operation of a computer, performing slowly enough so you can see what is happening, and working in decimal so you don't have to understand hex, octal or binary. The Simulated Computer has only 20 memory locations (0.02K of RAM!), only 10 possible instructions, and executes just 2 instructions per second.

After presenting the instructions, the computer displays the functional parts of a computer (Figure 1). In the upper left-hand corner is the INPUT area, where you enter your program and system commands. In the upper right-hand corner is the OUTPUT area where the results are displayed. In between is the CPU as shown by three registers: the AC (accumulator), the PC (program counter), and the IR (instruction register). Below this are the 20 memory locations, with addresses 0 to 19.

System commands permit you to LOAD memory locations, RUN the program, set operation modes, and HELP yourself to the screen summary of commands. Your program can use any of these 10 instructions:

0 — Stop or skip (depending on contents of the accumulator)
1 — Load the accumulator from memory location
2 — Store the contents of the accumulator into memory location
3 — Add contents of memory location to accumulator
4 — Subtract contents of memory location from accumulator
5 — Multiply contents of accumulator by contents of memory location
6 — Divide contents of accumulator by contents of memory location
7 — Input a number from keyboard into memory location
8 — Output contents of memory location
9 — Jump to instruction in memory location indicated

An instruction for the Simulated Computer is 3 digits: the first being the operation codes listed above, and the second and third being the memory location referenced. Here is a short example program with annotation:

118 load AC with contents of memory location 18
319 add to AC the contents of memory location 19
210 store contents of AC into memory location 10
810 output contents of memory location 10
000 stop

If a 3 was stored in location 18 and a 5 in location 19 to start, an 8 would be output (in the block at the upper right-hand corner of the screen) with this program. Since the program runs 2 instructions per second, it goes slowly enough for you to see what is happening, if you keep an eye on critical memory locations and registers. Even better, the RUNSTEP command executes the program but requires you to press the space bar for each machine cycle. Also, RUNSLOW executes the program automatically with a built-in delay between machine cycles (delay length set by user from 1 to 9). What is a machine cycle in this simulation? Three steps:

1. Load the instruction register (IR) from the memory location specified by the program counter (PC)
2. Increment the program counter (PC)
3. Execute the instruction contained in the instruction register (IR)

If you can't (or don't want to) keep track of this, you can use the DISPON command. Now, on execution, a message will be printed at the top of the screen for each machine cycle, telling what is happening.

What about the manual? It is simple, and to the point. There are 5 lessons. Each lesson has a step-by-step tutorial for entering and using a simple Simulated Computer program. It ends with some questions to check your understanding, or problems for you to program. Additional programming problems and solutions are contained in an appendix.

I think this is a worthwhile program—simple to understand and use, effective in presenting the material, reasonably priced, and with a very useful licensing procedure for educational use.

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Circle 73 on Reader Service Card

Listing 1

```
5  REM  ::::::::::::::::::::
10  REM
15  REM   A DEMONSTRATION
20  REM   OF EVOLUTION DUE
25  REM TO NATURAL SELECTION
30  REM
35  REM CALL -APPLE, SEPT 84
40  REM
45  REM    BY: KEITH
50  REM      STATTENFIELD
55  REM
60  REM ::::::::::::::::::::
65  REM
100  TEXT : HOME
105  DIM GENES%(100,5),WEEKDTA(20
     0)
110 NUMBER = 100
115  REM :
120  REM : CREATE 100 ANIMALS
125  REM :
130  FOR ANIMAL = 1 TO NUMBER
135 GENES%(ANIMAL,0) = 1
140  FOR GENE = 1 TO 5
145  VTAB 8: PRINT "     CREATING
      ANIMAL NUMBER ";ANIMAL
150 GENES%(ANIMAL,GENE) =  INT ( RND
     (1) * 5) + 1
155  NEXT GENE,ANIMAL
160  HOME : VTAB 24: PRINT "*****
     **************************
     *******": VTAB 12: PRINT "**
     ******** PRESS 'S' TO STOP *
     **********": VTAB 1: PRINT "
     **************************
     ***********"
165  VTAB 3: PRINT "WEEK ";: HTAB
     20: PRINT "POPULATION: "
170  VTAB 5: PRINT "ANIMAL "
175  VTAB 7: PRINT "ANIMAL SURVIV
     ABILITY FACTOR: "
180  VTAB 8: PRINT "RANDOM SURVIV
     ABILITY FACTOR: "
185  VTAB 14: PRINT "DATA FOR WEE
     K #"
190  VTAB 17: PRINT "AVERAGE SURV
     IVABILITY FACTOR:"
195  PRINT "CHANGE FROM LAST WEEK
      :"
200 WEEK = 1
205  REM :
210  REM :NOW, CALCULATE AND
215  REM :OUTPUT THE STATISTICS
220  REM :FOR THIS ANIMAL
225  REM :POPULATION
230  REM :
235 TSUM = 0:TNUM = 0
240  FOR ANIMAL = 1 TO 100
245  IF GENES%(ANIMAL,0) = 0 THEN
     280
250 SUM = 0
255  FOR GENE = 1 TO 5
260 SUM = SUM + GENES%(ANIMAL,GEN
     E)
265  NEXT GENE
270 TSUM = TSUM + SUM
275 TNUM = TNUM + 1
280  NEXT ANIMAL
285  REM :
290  REM : OUTPUT THE RESULTS
295  REM :
300  VTAB 14: HTAB 15: PRINT WEEK

305 WKVL =  INT (TSUM * 100 / TNU
     M) / 100
310  VTAB 17: HTAB 30: PRINT WKVL

315  VTAB 18: HTAB 30: PRINT  INT
     ((WKVL - OLDWKVL) * 100) / 1
     00;: CALL  - 868
320 WEEKDTA(WEEK) = WKVL
325 OLDWKVL = WKVL
330  REM :
335  REM  : GO ONTO THE NEXT WEEK

340  REM :
345  FOR GENE = 1 TO 5
350  FOR ANIMAL = 1 TO 100
355  IF GENES%(ANIMAL,GENE) <  >
     GENES%(1,GENE) THEN 375
360  NEXT ANIMAL
365  NEXT GENE
370  GOTO 650
375 GENE = 6:ANIMAL = 1000: NEXT
     ANIMAL,GENE
380  IF  PEEK ( - 16384) =  ASC (
     "S") + 128 OR WEEK = 200 THEN
     650
385  REM :
390  REM :AT LEAST ONE ANIMAL IS
395  REM :DIFFERENT FROM THE REST
     ,
400  REM :SO GO ON TO THE NEXT
405  REM :WEEK.
410  REM :
415  REM : NOW, LOOP THROUGH
420  REM :POPULATION UNTIL
425  REM :ALL OF THE ANIMALS
430  REM : ARE EXACTLY THE SAME
435  REM :
440  REM :     IN EACH LOOP,
445  REM :REMOVE ANY ANIMAL
450  REM :IN WHICH A RANDOM
455  REM :NUMBER FROM 1 TO 30
460  REM :IS LARGER THAN THE
465  REM :SUM OF THE VALUES OF
470  REM :THE ANIMALS "GENES".
475  REM :
480  VTAB 3: HTAB 6: PRINT WEEK;:
      HTAB 32: PRINT NUMBER; SPC(
     3);: PRINT
485  FOR ANIMAL = 1 TO 100
490  IF GENES%(ANIMAL,0) = 0 THEN
     640
495  VTAB 5: HTAB 12: PRINT ANIMA
     L; SPC( 3): PRINT
500 RANM =  INT ( RND (1) * 30) +
     1
505 SUM = 0
510  FOR TEMP = 1 TO 5
515 SUM = SUM + GENES%(ANIMAL,TEM
     P)
520  NEXT TEMP
525  VTAB 7: HTAB 30: PRINT SUM; SPC(
     3): PRINT : VTAB 8: HTAB 30:
      PRINT RANM; SPC( 3): PRINT

530  VTAB 15: HTAB 1: CALL  - 868
535  IF SUM >  = RANM THEN 640
540  REM :
545  REM :THE CURRENT ANIMAL HAS
550  REM :DIED, SO PUT A NEW ANIM
     AL
555  REM :INTO THE DEAD ANIMAL'S
     PLACE
560  REM :
565  REM :THIS ANIMAL'S GENES WIL
     L
570  REM :BE CREATED BY COMBINING

575  REM :THE GENES OF 2 OTHER AL
     IVE
580  REM :ANIMALS, RANDOMLY USING

585  REM :ONE OF THE TWO GENES IN

590  REM :EACH LOCATION TO GET TH
     E
595  REM :GENE FOR THE NEW ANIMAL
     .
600  REM :
605 FTHER =  INT ( RND (1) * 100)
      + 1: IF GENES%(FTHER,0) = 0
      THEN 605
610 MOTHER =  INT ( RND (1) * 100
     ) + 1: IF GENES%(MOTHER,0) =
     0 OR MOTHER = FTHER THEN 605

615  FOR GENE = 1 TO 5
620  IF  RND (1) > .5 THEN 630
625 GENES%(ANIMAL,GENE) = GENES%(
     FTHER,GENE): GOTO 635
630 GENES%(ANIMAL,GENE) = GENES%(
     MOTHER,GENE)
635  NEXT GENE
640  NEXT ANIMAL
645 WEEK = WEFK + 1: GOTO 205
650  REM :
655  REM :ALL ANIMALS ARE THE SAM
     E,
660  REM :SO END THE PROGRAM BY
665  REM :PRINTING A GRAPH OF THE

670  REM :WEEKLY AVERAGES.
675  REM :
680  HOME
685  PRINT "WEEK";: HTAB 6: PRINT
     "WEEKLY AVERAGE OF SURVIVAL
     TRAIT"
690  FOR LOOP = 1 TO WEEK
695  PRINT LOOP;: HTAB 5
700 STARS = WEEK(LOOP) * 35 / 25
705  FOR TEMP = 1 TO STARS
710  PRINT "*";
715  NEXT TEMP
720  PRINT
725  NEXT LOOP
730  PRINT : INPUT "SHOW GRAPH AG
     AIN?";ANSWER$:ANSWER$ = ANSW
     ER$ + " "
735  IF  LEFT$ (ANSWER$,1) = "Y" OR
      LEFT$ (ANSWER$,1) = "y" THEN
     650
740  VTAB 24: PRINT : PRINT : PRINT
     : END
```

Darwin's Apple

(Continued from page 7)

Finally, the island was subject to weather effects and, on a small chance, a storm occurred which would kill those animals that did not have a good enough nest built to withstand the storm.

Trading Off Traits

For the animal itself, many traits were created which described it to the computer. Two type of traits existed —single gene traits and multiple gene traits. Single gene traits included hair color, hair length, tail type, etc. These traits had only two possible values—on or off, meaning something like white or black, long or short, normal or stubby, etc. Multiple gene traits were composed of 5 gene pairs—some of these pairs were dominant, others were recessive. The value of a multiple gene trait was a value from 0 to 99—determined as the sum of 20 times each of the gene traits, where the trait was 0 if it was "off" and 1 if it was "on." This resulted in a number from 0 to 100, so if the result was 100 it was reduced to 99.

Although 20 distinct traits existed, only six were studied. These six traits —disease resistance, predator defenses, intelligence, food finding ability, nesting ability, and life expectancy —were the only ones upon which any selective pressure was exerted, and they were therefore the only traits in which any change would indicate an effect of evolution. The remaining

traits (hair & eye color, tail type, etc.) were merely along for the ride—they made the animal more complete and also served as a check on the project.

The six critical traits were the only multiple gene traits, and the values for these traits were all percentage values (0 to 99), except for life expectancy which was the result of the formula:

$$\frac{\text{26 weeks + (multiple gene trait value) x 140 weeks}}{100}$$

resulting in a number from 26 to 166 weeks (the length of the animal's life). The lowest value was 0, the highest was 99. The higher the value, the better chance the animal had of surviving in the simulated environment. A graph of the average values for these six traits at a certain time would be a "snapshot" of the evolutionary level to which the species had risen.

Computerizing Evolution

Now the animal and the conditions of its life were complete—all that remained was the writing of the program. This, I had thought, would be the easy part. The program, I decided, would consist of 3 parts: a *creator* segment that would create the animals at the beginning of the run from random values, a *statistical* segment that could be called to print out a set of data about the population, such as percentages of the different traits, and a *main* segment that would run the simulation. Originally I had planned to call the statistics segment once every twenty-five years and to run the program until the one thousandth year or the ten-thousandth animal, whichever came first (or until all the animals were dead). The three segments were to consist of a "base" set of subroutines which was the same in all three programs, and the actual code segments which differed among the programs.

An initial program run revealed several programming and logical errors. After eliminating most of the obvious bugs, I realized how slow the BASIC program was. It took it nearly 12 hours to simulate 6 months of life—at that rate, 1000 years of evolution would take 2¾ years to run. As this was clearly unacceptable for a project due in 5 months, the program would have to be speeded up—*drastically*! Fortunately, I had a BASIC compiler which I rarely used, and this seemed like an ideal occasion for it. Compiling the program required another week to change all the BASIC statements which the compiler would not accept. Then the program was run again.

This time, it finished 6 months of life in a little less than an hour (let's hear it for machine language!!). I ran the program with a trial set of data for a little less than 5 years. The data appeared to be fine, but the reason for the stoppage was not—a plague that had an 80% base chance of death had wiped out the entire population. Clearly, the plague was too deadly. I changed the plague death rates to 10%, 20%, 30%, 40% and 50%. Also, the population got above 133 animals and kept rising. Apparently the number of animals born during each week exceeded the number of animals killed by starvation along with a few other causes of death. Since the program would abort if the number of animals exceeded 200, the number of children born to females was reduced when the population was above 133 animals. This is justifiable, because if a female can barely find enough food to survive herself, she can hardly be expected to become pregnant and nurture five baby animals into this world.

Finally the system was complete—the entire program had been tested extensively and appeared to work correctly. I ran the program from 11:00 p.m. until I returned home from school the next day at 3:00 p.m. After a week of such processing, the computer had reached year 30. Just for the heck of it, I graphed the result up to that point and got the shock of my life—evolution had occurred and reached a maximum in five of the six important traits, while the sixth trait remained about the same level for the entire run. Yes, the sweet taste of success!

Because evolution had occurred so nicely in the first run, I decided to try it two more times. The original data disk was put aside and a fresh data disk was created with totally new animals at year 0. This run showed evolution in four of the six traits, while the other two traits remained the same. The third run lasted ten days, and showed evolution in five traits and devolution (reverse evolution) in one trait.

Natural Selection Demo

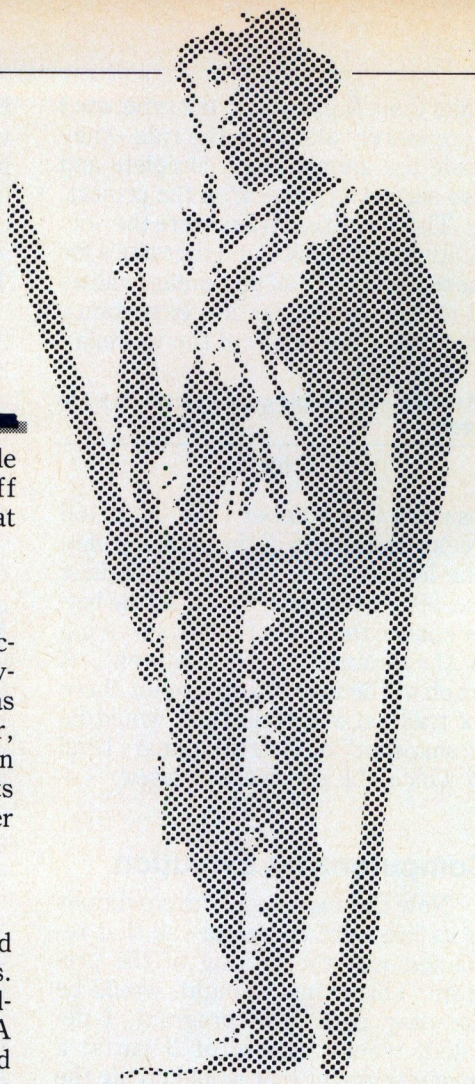
Although my entire program is too long to reproduce here, Listing 1 demonstrates the natural selection routine in a simplified form. Imagine that there are 100 mathematical animals, each of which has 5 genes. Each of these genes holds a number from 1 to 5, and the sum of each animal's gene numbers is the animal's survivability factor. The program loops through the entire population, calculating the survival factor of each animal and then comparing it against a random number from 1 to 30. If the random number is larger than the survivability factor, then the animal "dies," and a new animal is generated to take its place. This new animal's characteristics are determined by finding two other animals, and then setting each of the new animal's genes to the corresponding gene in one of the two parent animals. Thus, a new "offspring" would be created. If the random number were less than the animal's survivability factor, then the animal would survive and nothing would happen. So. animals with low survivability factors have a greater chance of getting killed off then animals with high survivability factors. Since the average of the survivability is displayed each week, then this average should reach a high value (somewhere near the maximum of 25), after several weeks if evolution does occur. After the program has processed 200 weeks, or if the "s" key is pressed during the execution of the program, a graph of the average survivability factor for each week is displayed.

Would Darwin Approve?

Many people believe that computers are the wave of the future, but are not sure whether the Apple can play a big part of that future in competition with larger and more powerful machines. As this project demonstrates, my little Apple helped me do something many people would have considered impossible even on a mainframe computer. I didn't *prove* the theory of evolution—no computer simulation can do that, nor did I expect mine would. Still, my program showed how natural selection can cause good genes to be preserved while bad genes are discarded.

Microcomputing at Minuteman Tech

Earle D. Hancock



In educational settings, Apple computers are used in a wide variety of specialized applications. This overview, written by the Master Computer Teacher at a vocational secondary school, reinforces the theme that Apples can play a vital role in enhancing many different activities.

MINUTEMAN Tech is a 1200-student regional vocational school situated in Lexington, Massachusetts, ten miles west of Boston. In addition to twenty-five vocational areas, the traditional high school subjects as well as special education services are provided.

Over thirty Apple II+ and *IIe* computer systems are stationed throughout the building. A distribution plan has been adopted that places most computers in teaching areas (academic and vocational). Teachers do not simply receive microcomputers for their classrooms, but must first demonstrate their ability to use and integrate the microcomputers in their classroom plans.

Many software packages have been reviewed and purchased and each is integrated into the existing curriculum. We serve as a software resource within our district, as well as to vocational schools statewide.

A five week computer literacy course is mandatory for each freshman class. The course introduces the major concepts of computer systems and operational procedures for the Apple II. Students are exposed to word processing, data base management, graphics and simulations.

Staff Training

Over one hundred staff members have completed microcomputer in-service training courses. The courses cover operation, structure and application of computer power in an educational setting. One such application, lesson development using Apple Pilot, has induced several staff members to produce lessons that have been sold commercially.

Special Education

Basic skill microcomputer instruction is provided according to Individual Education Plans in areas such as math, spelling, reading, grammar, visual perception and organization. In one experimental group, all students have been given training in computer literacy.

Carpentry

Students work on shop related vocabulary, decimals, and fractions. Several department quizzes are administered on the microcomputer. A joint shop project, "Super-Insulated House," has been completed. This project combines the talents of the Instrumentation and the Microcomputer departments for environmental monitoring and control, and the Building Trades department for construction.

Costs associated with the construction of the Super-Insulated house are traced using a spreadsheet program. Sub-totals for electrical wiring, plumbing, etc. and calculations of costs per square foot are readily available.

Science

Supplementary microcomputer programs provide instruction in chemistry, biology and physics. Many students in basic science receive science-related reading and spelling instruction on the microcomputer. Chemistry classes gather and analyze data from experiments using sensing probes and software specifically designed for this purpose. Several of the science department staff have implemented classroom management programs such as the *Apple Grade Book* and the *Teacher's Aid*.

Microcomputer Center

Numerous departments use the Library's Microcomputer Center. This center now averages more than 70 students per day with plans to expand service to 100 students per day. With its six microcomputer systems, the center handles overflow from several departments including math and electronics. The staff member in charge provides genreal computer familiarization to all interested students. Special individual projects such as SAT preparation, graphics and music are offered.

Communications / Human Relations

Staff-developed lessons in spelling, vocabulary and social studies are presented to students on the microcomputer. "Canned" programs in literature and word processing are used where time and computer availability can be scheduled. Extensive administration records of testing results and basic skill competencies are maintained within the department.

Guidance

Staff-developed software in vocational aptitude evaluation is offered to freshmen to assist them with their choice of a vocational major. Data Base systems are being developed to help manage student data for guidance counselors and to produce automated reports. Commercial software is used as an aid in college selection and occupational information.

Instrumentation

Prior to graduation, all seniors are required to operate the "Three Mile Island" nuclear power plant simulation program successfully prior to graduation. All instrumentation students use appropriate software as part of related theory classes. Additional plans call for microcomputer monitored analogic measuring and control systems to be implemented by instrumentation students in conjunction with the "Super-Insulated House" project. This vocational area also presents a Robotics program.

Distributive Education

Software sets are used regularly by students in the following areas: inventory control, typing skills, word processing, business games, and cash management.

Culinary Arts

A portion of related theory instruction in culinary arts is now presented on the microcomputer. Some of the courseware used in this program has been developed using Apple Pilot. Students are exposed to the practical aspects of word processing as well as inventory control systems.

Child Care

Students use the microcomputer to present instruction to children in our nursery school (math readiness and letter-shape identification). Even very small children seem to catch on to microcomputer use easily.

Electronics

Students are involved in writing business and scientific application programs in assembly language, BASIC, FORTRAN, COBOL, and Pascal. In addition, students learn to use canned programs for word processing, data base management and financial forecasting.

Health

Anatomy and Physiology software are used to enhance the learning of structure and function of body systems. The new Pillsbury Diet Program is used to access the individual's present daily diet and provides a print out of suggested modification to improve the diet.

Machine Shop

Students in machine shop use a word processing package to create and edit instructions for numerical control milling machines. The instructions are punched into a paper tape which in turn carries the information to the miller. This experiment in computer aided manufacture (CAM) has proven very successful and current plans are to expand the program to include an evening class for adults.

Drafting

Several computer systems are employed to teach and reinforce computer aided design (CAD) principles. One system accurately simulates, on an Apple computer, a much more expensive CAD system used in industry. The training our students receive will, in a large measure, be directly transferable to those jobs upon graduation.

Conclusion

A conscious attempt is made to weave microcomputer use into the educational fabric at Minuteman. The benefits of computer augmented learning (CAL) are enormous. In addition to being able to simulate situations too dangerous, expensive or time-consuming for the classroom setting, the microcomputer returns learning to the learner. It gives the teacher the opportunity to provide students with a less public, less threatening learning environment, affording opportunities for students to work one to one without consuming precious teacher time. When incorporated into the curriculum and under the direction of concerned and able teachers, the microcomputer becomes a powerful learning tool. The challenge for Minuteman and other educational institutions is to continue to adapt microcomputer power to the learning process.

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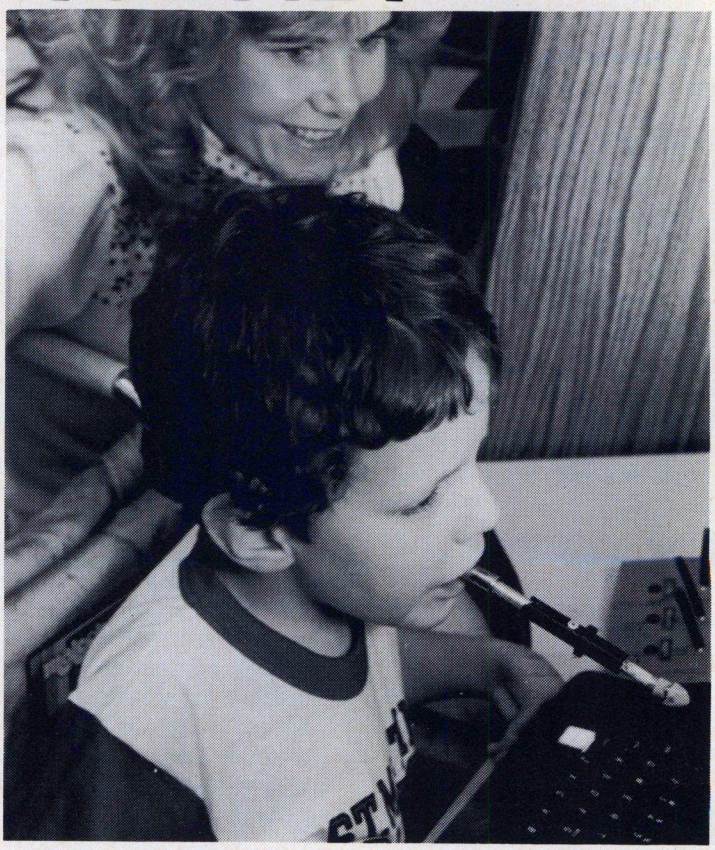
An Apple Helps RODNEY

Sheryl Blix



WHEN I met Rodney two years ago, he was a handsome six-year-old weighing 35 pounds. He was spinning his electric wheelchair in tight circles, in the parking lot at Saint Martin's College. He didn't seem overly thrilled with meeting me, but he was anxious to find out where "those computers" were.

Rodney's occupational therapist had earlier visited the Microcomputer Resource Center at Saint Martin's and discussed his special needs with me. Rodney has arthrogryposis, a rare congenital disease that results in inflexible joints and muscular atrophy. It has immobilized Rodney's arms and legs. We both agreed that, by using a special mouth wand, he might be able to operate a computer.

Rodney at the computer was like a child on Christmas morning. He was particularly fascinated by a program called "The Saint Martin's College Picture Book." By hitting just one key with his mouth wand, he could display a picture on the screen. He was obviously excited by this experience. For the first time in his life he could turn the pages of a picture book with ease.

After we tried several other programs, I showed him how to write his own in BASIC. He typed:

```
10 PRINT "RODNEY";
20 GOTO 10
30 END
```

This project took quite a while to complete, but it was magic seeing his name all over the screen and realizing that it was *he* who had instructed the computer to do that.

Rodney's neck was tired by the time he left that day, but his spirit was refreshed. I knew he'd be back, and so would I. We were hooked!

I can't recall wanting to do anything more strongly than to help Rodney use a computer. I saw so much promise locked up in a body with many limitations, yet I felt unqualified to help. Seeking help from experts across the country, I received a consistent piece of advice—that it was important for Rodney to begin using a microcomputer as soon as possible. "It could be the key to his intellectual development, independence and future career," one expert said.

Hardware Modifications

Three major problems prevented Rodney from using the Apple Computer independently. First, he could not turn the computer on and off. Second, he could not depress the control, shift or repeat key plus another key at the same time. Third, he was unable to insert the disk into the disk drive.

The first problem was solved when a friend donated an outlet strip with an on/off switch. By plugging the computer and monitor into this strip and placing it within his reach, Rodney could activate the machine independently.

The solution to the second problem was found in the *Trace Center International Hardware/Software Registry for the Physically Disabled* from the University of Wisconsin. The Registry includes the design for a special key-lock box that connects to the keyboard. We had one built for Rodney.

The third problem is yet to be solved. Rodney can remove a disk from the disk drive with his mouth wand, but we have not discovered a satisfactory method to allow him to insert the disk. Rodney and I would welcome suggestions from readers.

Once the hardware modifications were made, we had to select appropriate applications software. Rodney uses the computer in 5 ways: to write, to draw, to obtain educational training, to simulate physical experiences, and to enjoy recreation.

Writing

Rodney, when not at the computer, writes with a felt pen held in his mouth. The process is slow and laborious. However, with a word processing program, the computer becomes an instrument for writing.

Rodney uses a program called *Bank Street Writer*. With it he can

write, store his writing on a disk, and get a copy on the printer without any help (except to get the disk into the disk drive). He can also edit a document saved on the disk and print out a revised version. He writes letters, maintains spelling lists, and completes other writing assignments for school.

The now eight-year-old Rodney has taken on even larger projects. For instance, he's compiling a recipe book! So far it has only one recipe in it—Ice Cube Slush, revised several times after making ice cube slushes in my office for weeks! He has also assumed the project of assembling the names, birthdates, and dates of death of all the monks in the Saint Martin's cemetery.

Rodney also uses a program called *The Story Machine*, which illustrates a story with screen graphics as it is typed in. The program requires that all spelling and grammatical structures be correct.

Drawing

Rodney is quite the artist. He enjoys drawing pictures with a felt pen in his mouth, but now he has a more powerful artistic tool. He has used several drawing programs, but he prefers to write his own programs to generate pictures. He uses low- and high-resolution graphics in BASIC, and has even learned to animate his figures. his collection of graphics includes E.T., a robot, the inner planets, and his brother Tony. He has written a story program about the TV show *Knight Rider*, which includes pictures of Kitt, the car, and Michael, the main character. Rodney has animated mouths to move, clouds to float by, and scenes to change.

Educational Experiences

Rodney uses his Apple as an educational tool. He runs programs that provide drill and practice in math and language skills. We have found programs to teach him about such new things as astronomy, his favorite topic these days. Other programs help him develop problem-solving skills.

For a child who cannot turn pages with his hands, the computer can simulate page turning. It responds immediately and patiently to his input. At long last, Rodney has a tool that responds as quickly as his mind rather than as inadequately as his body.

Besides using programs already written, Rodney is developing problem solving skills through his creative use of programming in BASIC and Logo. Learning programming has shown Rodney that he can control the machine himself. And he wants to do just that!

Life Experiences

Through computer simulations Rodney can experience things that he cannot experience otherwise. For example, one program allows him to run his own lemonade stand. By planning advertising, determining how much lemonade to make, and deciding how much to charge per glass, he can obtain the sense of running a child's small business.

He has other simulation programs which allow him to put together a puzzle, move disks in the Towers of Hanoi game, fire rockets, move bumper cars, shoot balls into a basketball hoop, and fly an airplane. The computer allows Rodney to participate in activities that normally require the use of arms and legs.

Recreational Tool

Rodney was once asked why he likes to use his computer. He replied "Now, when other kids go outside to play, I have something I can do, too." Use of the computer as a recreational tool is an important application for a physically disabled child. Rodney can play tic-tac-toe, checkers, and other games via this terminal. Since his participation only requires that he access the keyboard, he can compete equally with other children.

Future

From the age of three, Rodney's schooling had taken place in special education classrooms with other handicapped children. He's now part of a regular second grade class, with children who have normal physical capabilities. The combination of his bright mind and the computer as a tool have provided the keys to Rodney's mainstreaming.

Rodney's therapist, his parents and I are working to equip his wheelchair with a small computer. It will have a screen and printer permanently attached, and a word processing program built in. This portable communication device will allow him to produce written work wherever he happens to be. This tool will be essential for his successful progress in school. With a modem he will also be able to communicate with other computer operators around the country. (Watch out, world, when Rodney gets a modem!)

Not only does this powerful tool help Rodney perform successfully in a regular classroom now, but it will also provide him with expanded career opportunites. Occupations that require writing, data entry and manipulation, and/or computer programming may now be open to him.

Already he is confident in his computer skills. One day he asked me, "Do you think that someone might pay me to run this computer?" I replied, "Why Rodney, are you a little short on cash?"

"Yeah," he replied, "my brother Tony has a quarter and three pennies and I'm broke."

Taking the opportunity to encourage some goal-setting, I said: "Well, Rodney, when you grow up and learn a lot about computers, someone will pay you to run them."

His response: "I already know a lot."

All I could answer: "Yes, you do."

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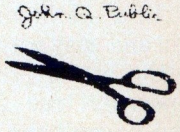

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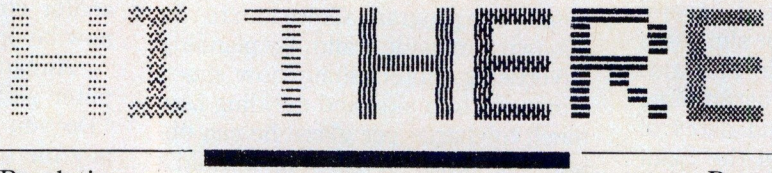
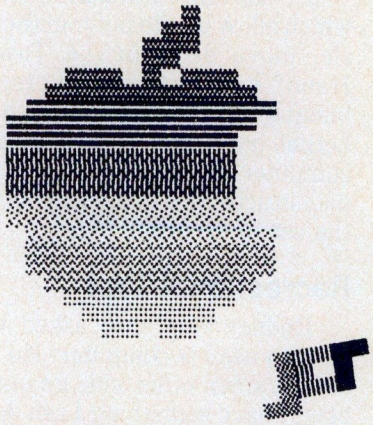


APPLE'S High-Resolution graphics capabilities have been the subject of numerous articles and books. Given the proper programming skills or tools, it is possible to create some amazing displays on the Hi-Res screen. But this should not be allowed to completely overshadow the possibilities of Low-Resolution graphics. After all, when the Apple was first introduced, many of us (yes, we date back that far!) could not afford enough memory to use the high resolution display, but good old Lo-Res was right there. It requires none of the precious program memory area; instead it uses the same memory as the text page, but is interpreted differently by the hardware to produce blocks of colors (sixteen of them, if you count black).

Low resolution graphics are a natural and easy way to introduce people to the art of programming. This is especially true for young children, who haven't the mathematical skills to be able to use many of the other facilities of BASIC. The idea of X,Y coordinates denoting positions on the screen is not hard to learn (and indeed is itself an important subject for students in the early grades), and the need to figure out a pattern in these coordinates to produce a vibrant color display of their very own picture acts as a great incentive.

Harnessing Children's Energy

Working with many children in the "Academically Gifted" programs in grades 2-5 in the Wake County (Raleigh) NC schools, we have found



them all interested in being able to design their own graphic images on the Apple. These have often included representations of the logos for their favorite football and basketball teams, their names in big, brightly colored, block letters, and the same sorts of scenes and faces that they would draw using more conventional paper and crayons. Our purpose has been to harness this enthusiasm to promote familiarity with actually programming the computer.

Unfortunately, several factors combine to make it difficult for most children to simply sit down and write a program to draw a low-resolution picture. First, it calls for a lot of VLIN and HLIN statements, and the children are not usually good enough typists (we have a separate set of programs that we use to develop these skills) to avoid enthusiasm-dampening error messages. Also, the need to type in a few lines, and then RUN the program to see what has happened, and then list the program and add some more lines, is a very slow process. Programs that draw interesting pictures often have several pages of VLIN and HLIN statements.

Drawing as Programming

A program using READ and DATA would be much more efficient, and indeed we have tried this, but this approach requires first introducing the children (and the teachers!) to a number of additional programming concepts before they can really get to the point of seeing something happen. Therefore, what we have done is write an interpreter program called LOW-RES DRAWING that allows the child to construct color graphics displays on the low-resolution color display screen with a minimum of key presses, or other programming skills.

The program makes it easy to set color and draw horizontal or vertical lines, yet uses the same terminology as the BASIC commands, which eases the transition to "real" programming later on. Pressing the first letter of these commands (C,V,H) causes the program to display the entire word, and ask the student to enter the required information in essentially the same format as the BASIC statements, except that we can error check them on entry to prevent frustration with silly values. If a wrong line is entered, pressing D (for delete) will remove it from the list of lines, which the program remembers. Pressing R (Re-draw) will clear the screen and draw all lines up to the present one, in order, each in its own color. This is a separate action, not automatically done after Deletion, be-

Listing 1

```
LOW-RES DRAWING : JOHN RUSS
100  GR : VTAB 21: HTAB 1: CALL -
     958: DIM D%(500,4):N = 0:CL =
     15:D$ = CHR$ (4)
110  DIM B%(15,3): FOR Z = 0 TO 1
     5: FOR K = 0 TO 3: READ B%(Z
     ,K): NEXT K,Z: REM DOT PATTE
     RNS FOR HARDCOPY PRINTOUT
120  DATA 0,0,0,0,18,0,18,0,34,8,
     17,4,21,0,21,0,18,36,18,9,18
     ,18,18,18,18,37,18,41,21,42,
     21,42,21,21,21,21,63,0,63,0,
     63,16,63,4,63,10,63,20,27,54
     ,27,54,27,27,27,27,63,21,63,
     42,63,63,63,63
130  VTAB 21: HTAB 1: CALL - 958
     : PRINT "          LO-RES GRAP
     HICS PLOTTER": PRINT "->";: POKE
     49168,0
140  GET KB$: ON KB$ ( ) "Q" GOTO
     150: POKE 49168,0: INPUT "QU
     IT (CONFIRM - Y/N)? ";YN$: ON
      LEFT$ (YN$,1) ( ) "Y" GOTO
     130: TEXT : HOME : END
150  ON KB$ ( ) "V" AND KB$ ( )
     "H" GOTO 210: PRINT KB$"LIN"
     ;:D%(N,0) = (KB$ = "V")
160  VTAB 22: HTAB 8: INPUT "FROM
     ";KB$: ON LEN (KB$) = 0 GOTO
     130:L1 = VAL (KB$): IF L1 (
     ) INT (L1) OR L1 ( 0 OR L1
     ) 39 THEN PRINT CHR$ (4):
     GOTO 160
170  VTAB 22: HTAB 18: INPUT "TO:
     ";KB$: ON LEN (KB$) = 0 GOTO
     160:L2 = VAL (KB$): IF L2 (
     ) INT (L2) OR L2 ( 0 OR L2
     ) 39 THEN PRINT CHR$ (4):
     GOTO 170
180  VTAB 22: HTAB 30: INPUT "AT:
     ";KB$: ON LEN (KB$) = 0 GOTO
     170:L0 = VAL (KB$): IF L0 (
     ) INT (L0) OR L0 ( 0 OR L0
     ) 39 THEN PRINT CHR$ (4):
     GOTO 180
190  D%(N,1) = CL:D%(N,2) = L0:D%(
     N,3) = L1:D%(N,4) = L2:L = N
     : GOSUB 460:N = N + 1: ON N (
     = 500 GOTO 130
200  VTAB 23: HTAB 1: PRINT "STOR
     AGE SPACE IS FULL":: END
210  ON KB$ ( ) "C" GOTO 230: POKE
     49168,0: INPUT "COLOR= ";YN$
     : ON LEN (YN$) = 0 GOTO 130
     :L0 = VAL (YN$): IF L0 ( )
      INT (L0) OR L0 ( 0 OR L0 )
     15 THEN VTAB 22: HTAB 3: CALL
     - 958: GOTO 210
220  CLR = L0: GOTO 130
230  ON KB$ ( ) "D" GOTO 250: PRINT
     "DELETE LAST LINE":N = N - 1
     : IF N ( 0 THEN N = 0
240  GOTO 130
250  ON KB$ ( ) "R" GOTO 270: PRINT
     "REDRAW LINES SO FAR ": IF N
     ( 1 THEN GR : GOTO 130
260  GR : FOR L = 0 TO N - 1: GOSUB
     460: NEXT L: GOTO 130
270  ON KB$ ( ) "S" GOTO 320: POKE
     49168,0: INPUT "SAVE IN FILE
     :";FL$: ON LEN (FL$) = 0 GOTO
     130: ONERR GOTO 300
280  IF FL$ = "CATALOG" THEN GOSUB
     440: GOTO 260
290  PRINT D$"VERIFY "FL$: POKE 2
     16,0: VTAB 23: HTAB 1: PRINT
     "THAT NAME HAS BEEN USED. TR
     Y AGAIN.": VTAB 22: HTAB 3: CALL
     - 868: GOTO 270
300  POKE 216,0: IF PEEK (222) (
     ) 6 THEN VTAB 23: HTAB 1: PRINT
     "UNABLE TO ACCESS DISK. FIX
     PROBLEM.": VTAB 22: HTAB 3: CALL
     - 868: GOTO 270
310  PRINT D$"OPEN "FL$: PRINT D$
     "WRITE "FL$: PRINT N: FOR L =
     0 TO N - 1: FOR J = 0 TO 4: PRINT
     D%(L,J): NEXT J,L: PRINT D$"
     CLOSE "FL$: GOTO 130
320  ON KB$ ( ) "L" GOTO 380: POKE
     49168,0: INPUT "LOAD FROM FI
     LE: ";FL$: ON LEN (FL$) = 0
      GOTO 130: ONERR GOTO 360
330  IF FL$ = "CATALOG" THEN GOSUB
     440: GOTO 260
340  PRINT D$"VERIFY "FL$: POKE 2
     16,0: PRINT D$"OPEN "FL$: PRINT
     D$"READ "FL$: INPUT K: IF K +
     N ) 500 THEN PRINT D$"CLOSE
     ": VTAB 23: HTAB 1: PRINT "N
     OT ENOUGH ROOM TO LOAD.": FOR
     J = 1 TO 2000: NEXT J: GOTO
     130
350  FOR L = N TO N + K - 1: FOR
     J = 0 TO 4: INPUT D%(L,J): NEXT
     J,L: PRINT D$"CLOSE "FL$:N =
     N + K: GOTO 260
360  POKE 216,0: VTAB 23: HTAB 1:
      IF PEEK (222) ( ) 6 THEN
      PRINT "UNABLE TO ACCESS DIS
     K. FIX PROBLEM.": VTAB 22: HTAB
     3: GOTO 320
370  VTAB 23: HTAB 1: PRINT "THAT
      FILE ISN'T ON THE DISK. TRY
      AGAIN.": VTAB 22: HTAB 3: GOTO
     320
380  ON KB$ ( ) "P" GOTO 420: POKE
     49168,0: INPUT "PRINT - IS P
     RINTER READY (Y/N) ?";YN$: IF
      LEFT$ (YN$,1) ( ) "Y" THEN
     130
390  PRINT CHR$ (4)"PR#1": PRINT
     : PRINT CHR$ (27)"T12": FOR
     Y = 0 TO 39: PRINT CHR$ (27
     )"S0320":: FOR X = 0 TO 39:Z
     = SCRN( X,Y): FOR J = 1 TO
     2: FOR K = 0 TO 3
400  ON PEEK (49601) ) 127 GOTO
     400: POKE 49296,B%(Z,K): NEXT
     K,J: NEXT X: PRINT : NEXT Y:
      PRINT CHR$ (27)"B": PRINT
     : PRINT CHR$ (4)"PR#0"
410  GOTO 130
420  ON KB$ ( ) "?" GOTO 130: PRINT
     "COMMANDS: V=VLIN H=HLIN C=C
     OLOR G=QUIT D=DELETE R=REDRA
     W S=SAVE L=LOAD P=PRINT
      ":: INVERSE : PRINT " PRESS
      SPACE BAR TO CONTINUE ":: NORMAL
     : POKE 49168,0
430  GET KB$: ON KB$ ( ) " " GOTO
     430: GOTO 130
440  TEXT : HOME : PRINT : PRINT
      CHR$ (4)"CATALOG": PRINT : PRINT
     : INVERSE : PRINT " PRESS SP
     ACE BAR TO CONTINUE ":: NORMAL
     : POKE 49168,0
450  GET OK$: ON OK$ ( ) " " GOTO
     450: HOME : RETURN
460  COLOR= D%(L,1): IF D%(L,0) =
     1 THEN VLIN D%(L,3),D%(L,4)
      AT D%(L,2): RETURN
470  HLIN D%(L,3),D%(L,4) AT D%(L
     ,2): RETURN
```

cause we find that children can often use the presence of the "wrong" line as a guide to what values should be entered to create the "right" one.

There is no need for a separate manual for the program, because the child can always press "?" to see a reminder of what command keys can be used, and each operation that requires more information requests it in a question and answer dialogue. The fact that the terminology (VLIN, HLIN, COLOR=, etc.) is the same as Applesoft, takes advantage of whatever browsing the child has done in the Apple manuals, or books like *Kids and the Apple* and will also reinforce later programming efforts as well.

The program will remember a long sequence of color and line choices. (The program is actually dimensioned for 500, which could be changed. We have seen drawings which used well over 200.) The list of commands can be stored on disk (in a text file, but the student need not know the details of this) by pressing S (for SAVE), and entering a filename. Likewise, pressing L (for load) will load an existing drawing into memory. When a drawing file is loaded, it is appended to the end of whatever is already there. This allows a child to draw parts of a complex drawing at various times, when they have access to the computer. Of course, it is also possible to load an existing image and then add to it (or delete from it).

To promote awareness of what disk files are all about, the program allows a child to type "CATALOG" when asked for the name of a file, and see a catalog of disk contents. The program will not overwrite an existing file, but makes the child enter a new name. Only after exiting from the program can the DOS DELETE command be used to remove a drawing file from the disk.

Hard Copy, Too

Finally, of course, every child wants a copy of his or her picture to show to friends and family. Very few of the graphics recording programs or intelligent interface cards provide for the recording of Low-Res graphics (apparently PKASO does, but not the Grappler cards we use, nor any of the software such as Zoom Graphics, which in any case could not be merged with our program). Consequently, we have added this capability into the program. When P (= PRINT) is pressed, the program asks the child to confirm that the printer is indeed connected and turned on (otherwise the system would hang when it tried to print out). Then it reads each location on the text screen and prints out a dot pattern that is unique for each color. (Incidentally, the same protection of asking for confirmation is also used when the child presses Q to quit.)

We don't have a true color printer, but the black and white images have proven themselves very popular. The different patterns that we have chosen are contained in the data statements. They increase in density as the color number goes from 1 to 15.

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Each pattern has six vertical dots and covers eight dots across. Horizontally, the pattern repeats four values twice, so only four integers are needed for each color pattern.

The program requires some customization for use with various printers. Many dot matrix printers allow direct control of the printhead to record graphics images, and use the same conventions for the interpretation of codes as dots, but the method used to switch from text to graphics and back is not consistent. The program as written shows the appropriate code for the C.Itoh 8510AP Prowriter (which is identical in this respect to the NEC 8023 and probably very similar to the Apple DMP, all of which share the same mechanism). This is one of the more popular printers. If you have one, you can look in your reference manual and discover that lines 390–400 set the printer to a line spacing of 12/144'ths of an inch (the height of the dot pattern), and then for each line of the image, the printer is told that 320 sets of dots are coming (40 points times eight dots). At the end, the printer is reset to normal line spacing.

To illustrate a rather different way to accomplish the same thing, the program modifications for an IDS 440 Paper Tiger are also shown. This printer requires a single character code to place it in graphics mode. Then, at the end of each line, a special "short" line feed is issued. At the end of the image printout, the printer is set back to text mode. Adding similar modifications for other printers should be quite straightforward if you have the manual that describes how graphics control is achieved.

Interested programmers will note that the data are passed to the printer using a PEEK, POKE sequence. This directly tests the ready line on the parallel interface and sends the characters (actually the graphics dot patterns) directly to the interface, rather than PRINTing them. This should work with any parallel card that is compatible with the Apple, because it is the same method that is used by the Apple Pascal system. Hence, there is no requirement to perform customization depending on the interface card being used (we have tested it with several). It does assume that the interface card is in slot one, but this can be easily changed by adding 256 to the addresses for each slot number, and changing the PR#1 command.

In addition to the program (and the Paper Tiger modification), there is an example of a picture that was drawn, and printed out. We have also included a short utility program that will print the contents of the file, for possible use in writing a more "conventional" lo-res graphics program to show the image. The list of 56 lines used in the drawing is shown.

We hope that many other teachers will use this program to introduce their students to the Apple's low resolution graphics, which have a valuable role to play in encouraging familiarity with the computer and with the subsequent learning of programming skills.

Listing 2

```
IDS 440 MODIFICATION

390   PRINT  CHR$ (4)"PR#1": PRINT
      : PRINT  CHR$ (3):: FOR Y =
      0 TO 39: FOR X = 0 TO 39:Z =
       SCRN( X,Y): FOR J = 1 TO 2:
       FOR K = 0 TO 3
400   ON  PEEK (49601) ) 127 GOTO
      400: POKE 49296,B%(Z,K): NEXT
      K,J: NEXT X: PRINT  CHR$ (3)
      ; CHR$ (11):: NEXT Y: PRINT
       CHR$ (3); CHR$ (2): PRINT :
       PRINT  CHR$ (4)"PR#0"
```

Listing 3

```
PRINT DRAWING FILE

1000 D$ =  CHR$ (4): TEXT : HOME
     : INPUT "FILENAME: ";FL$: IF
      LEN (FL$) = 0 THEN  END
1010  IF FL$ = "CATALOG" THEN  PRINT
     D$"CATALOG": PRINT : PRINT :
      INPUT "PRESS RETURN TO CONT
     INUE";KB$: RUN
1020  ONERR  GOTO 1040
1030  PRINT D$"OPEN "FL$: PRINT D
     $"READ "FL$: INPUT N: DIM D%
     (N,4): FOR J = 1 TO N: FOR K
      = 0 TO 4: INPUT D%(J,K): NEXT
     K,J: PRINT D$"CLOSE": GOTO 1
     050
1040  POKE 216,0: PRINT "UNABLE T
     O LOCATE OR ACCESS THE FILE.
     ": FOR J = 1 TO 3000: NEXT J
     : RUN
1050  POKE 216,0: PRINT : PRINT "
     HARDCOPY (Y/N)? ";: POKE 481
     69,0
1060  GET KB$: ON KB$ <  > "Y" AND
     KB$ <  > "N" GOTO 1060: PRINT
     KB$: IF KB$ = "Y" THEN  PRINT
     D$"PR#1"
1070  PRINT "THE DRAWING CONTAINS
      "N" LINES.": PRINT "DIR
      CLR      FROM      TO
      AT": FOR J = 1 TO N: PRINT
      MID$ ("HV",D%(J,0) + 1,1)"
           "D%(J,1);: HTAB 19: PRINT
     D%(J,3);: HTAB 28: PRINT D%(
     J,4);: HTAB 37: PRINT D%(J,2
     ): NEXT J
1080  PRINT  CHR$ (4)"PR#0": END
```

Listing 4

```
]THE DRAWING CONTAINS 56 LINES
DIR    CLR    FROM    TO     AT
V      1      1       7      1
H      1      1       5      4
V      1      1       7      5
H      4      7       9      1
H      4      7       9      7
V      4      1       7      8
H      5      13      17     1
V      5      1       7      15
V      9      1       7      19
V      9      1       7      23
H      9      19      23     4
V      10     1       7      25
H      10     26      28     1
H      10     26      28     7
H      10     26      28     4
V      13     1       7      30
H      13     31      33     1
H      13     31      33     4
V      13     2       3      34
V      13     7       7      34
V      13     6       6      33
V      13     5       5      32
V      7      1       7      36
H      7      37      39     1
H      7      37      39     4
H      7      37      39     7
H      15     11      29     10
V      12     15      17     22
V      12     16      18     21
V      12     17      19     20
H      12     16      18     19
H      12     22      24     19
H      12     15      25     20
H      13     14      26     21
H      13     13      25     22
H      13     13      24     23
H      10     13      24     24
H      10     13      24     25
H      10     13      24     26
H      2      13      24     27
H      2      13      25     28
H      2      14      26     29
H      4      14      26     30
H      4      14      26     31
H      4      15      25     32
H      3      16      24     33
H      3      17      23     34
H      3      18      19     35
H      3      21      22     35
H      7      34      35     39
V      7      39      36     35
V      9      38      36     36
H      9      36      37     36
H      9      36      37     38
V      15     36      38     38
H      15     38      39     36
```


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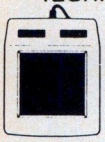

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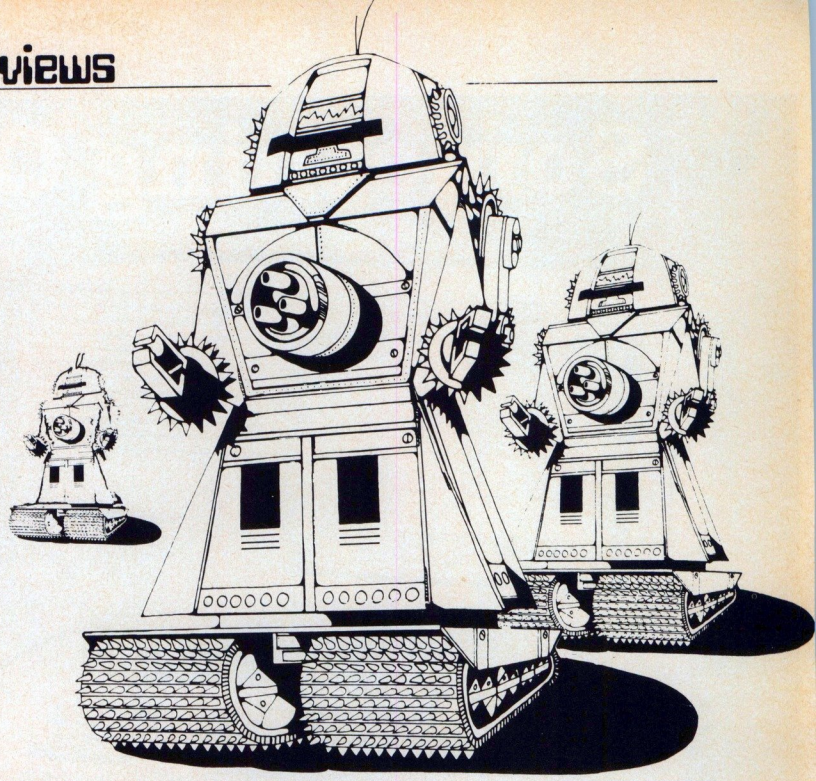
RobotWar—

Review and Challenge

Jeff Sandys



WHEREVER students have access to several computers you can often find them racing their programs. They learn a lot about programming as they speed up their sorting or factoring routines. *RobotWar*, by Muse Software is a unique game that provides a similar competitive environment for programmers. The life of your robot depends on the program you give it.

The game action takes place on a battlefield where up to five robots fight to the death. Horizontal and vertical motion is provided by two motors. A radar unit is used to detect other robots and the walls. Damage is inflicted with a gun. These devices are all controlled by the robot's microprocessor brain.

The microprocessor has an accumulator, index register, 24 data registers, and nine I/O ports. The language is like a tiny version of BASIC. The instruction set includes direct and indirect GOTOs and GOSUBs, simple arithmetic and IF statements using numeric comparisons. The robot object code is limited to 256 instructions.

Robots are programmed with the editor, assembler, and test bench. The screen editor, with a full set of commands, can handle 10K of source code. The assembler converts source to object code and reports errors. The test bench is used to debug the object code. Watching each step execute makes it easy to understand computers. The ultimate test for your robot is the battlefield where illogical code quickly becomes apparent.

RobotWar has become a classic Apple game. The clearly-written documentation has a sample program, and there are five robots on the disk. Although the game is starting to show its age (the animation is not as smooth as many of the new games), it is still a fun way to learn about programming and robots. I recommend it for beginners and experts alike.

A Robot Challenge

Randy, my robot, and I challenge all *Call -A.P.P.L.E.* Robot Warriors to a tournament. Send a copy of your source code on disk by October 20, 1984, to the address listed below. If you include your member number and return postage, I'll send back your disk with the source code of all the entries. The tournament will be held during the Northwest Computer Show at the Seattle Center on October 27 & 28, 1984. An appropriate prize will be awarded to the winner.

Jeff Sandys
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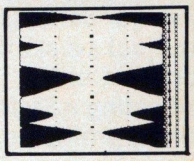

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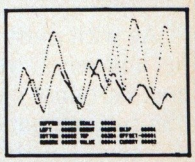

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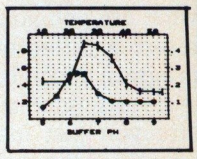

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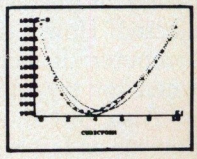

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Something Over 32 Bits

Questions & Answers About Apple's Lisa and Macintosh 32-bit Computers

Dave Redhed

In the review of Microsoft BASIC for the Macintosh it was stated that a major deficiency was its inability to eject a diskette from within a program. Couldn't this be done by selecting a Shift-Command-1 after being prompted by the program?

As with most computer questions, the answer is yes and no. You can most certainly eject the diskette with a Shift-Command-1 while you are in Microsoft BASIC. The big question is what are you going to do next? If you insert a different diskette and your program executes a read or write, the system immediately ejects the diskette you just inserted and asks (by name) for the diskette you previously ejected! How's that for an impudent computer? It won't even believe you when you try and trick it.

Also, lest there be any of you as devious as I, it will do you no good to give the newly inserted diskette the same name as the old one. In spite of the fact that the system calls diskettes by name, it uses more than just the name to identify diskettes. I do not know if there is a way to fool the system into thinking that two different diskettes are the same, but I judge that if you succeed in doing so, you will regret it (except maybe at the next club meeting where you can wow everyone with your cleverness).

The basic difficulty with ejecting diskettes with the Shift-Command-1 is that this is a "feature" which is inconsistent with normal diskette operations. This method was intended as an aid to developers during program testing, when a program hangs up and stops responding to the mouse or keyboard. Ejecting a diskette in this manner is nearly the equivalent of a mechanical button to do the eject. A user should never have to use this method and doing it could damage the diskette contents under certain conditions. The normal ejecting procedure gives the operating system an opportunity to empty buffers and do all the other little detailed tasks that keep the diskette healthy. The Shift-Command-1 is recognized and acted upon at a much lower level of logic than the Command-E. The operating system does not even have a chance to ask you if you really want to do an immediate eject. Certainly there are times when it doesn't hurt, but the big problem is that most of us cannot tell when it is safe and when it is not.

I have one of the early Lisa computers with the dot matrix printer that uses the parallel interface. How can I get anything printed when I am running Mac programs under MacWorks?

You can't. MacWorks is currently dedicated to printed output on Lisa's serial port B, and there is no way to change it. I would judge that this will not be modified in the future, since Mac knows nothing about parallel ports. Lisa will handle either the ImageWriter or the DMP printer, or both at the same time. Mac software, however, works only with the ImageWriter (or another printer attached to the serial port), regardless of whether or not it is running in a Lisa. The only cure I know of is to buy an ImageWriter and hook it to serial port B on Lisa.

When will Mac programs running on Lisa be able to use the hard disk?

The Lisa 7/7 installation software, released in August 1984, has the option to reserve part of the hard disk for use with MacWorks. The hard disk version of MacWorks is due out sometime in September. I have tried this out under a pre-release version of the new MacWorks and the speed of interaction is greatly improved. However, it is pretty easy to chew up a megabyte of disk with Mac files and fonts, so users with Lisa Office systems may have some space problems unless they have a 2/10.

I get so frustrated piecing together pictures from MacPaint. Isn't there a way to copy and paste an entire MacPaint document, or at least something bigger than the drawing window?

Not at this time. As with many things right now, this is fundamentally a small memory problem. If you can't hold the entire picture in memory, it makes it hard to copy the entire picture. I imagine that Bill Atkinson has a version that runs on a 512K Mac and is itching to have people use it. Certainly the limitations which the small memory places on MacPaint are as painful to him as they are to us. However, we also need to remember that some very impressive work has been done with MacPaint in spite of these difficulties.

What can you tell me about the new color printer that supports color output from Lisa?

Not a whole lot. It is made by Canon, costs $795, and is an ink-jet printer. There was an advertisement for it on page 229 of the July issue of *Byte*. Lisa owners will be interested to know that it must be connected through a parallel port, not one of the serial ports. For owners of the original Lisa this is not likely to pose any problems, since they already had a two-port parallel card to which to attach the dot matrix printer. Lisa 2 owners may not have such a card since the ImageWriter connected to a serial port. This parallel card costs $195. I expect to have one of the printers in the very near future, so I will be able to give your much more information soon.

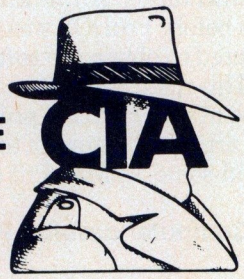
Anticipating the next question in this area, I am not aware of any plans for connecting this printer to Mac. I would judge that it is unlikely for a couple of reasons. First, Mac has no parallel port built in. Second, adding the color functions to the various Mac application programs would probably have to wait on more memory. On the positive side, all the QuickDraw graphics routines in Mac's ROM have the ability to support color.

Why won't the ImageWriter on Lisa print out MacPaint pictures correctly even though it will print MacWrite documents correctly?

This is not a printer problem, it is a display problem. The MacWrite picture on the screen is just as warped as the MacPaint picture, it just doesn't look as bad with text as with geometrical shapes and illustrations. As I explained in the July issue, the screen image of MacPaint graphics on Lisa is skewed vertically at a ratio of 3 to 2. If you wrote a Macintosh BASIC or Pascal program to draw a square on the screen, it will look like a tall and narrow rectangle on the Lisa screen even though it will print as a square. In MacPaint, you construct a square by observing that the sides of the rectangle appear (to your eyes) to be equal in length. If you could look at the MacPaint coordinates for that object, you would see that it actually is a rectangle that is short and wide, and this is how it comes out on the printer. Using MacPaint on Lisa is a reasonable activity as long as you keep your printer shut off. I hope that the version of Macpaint that will come out with the 512K Mac will solve this problem and create illustrations which will print just like they appear on the Lisa Screen.

We would like to encourage readers who are interested in Apple's 32 bit computers to send in questions they would like to see answered in this column. Write to : 32 Bit Questions, Call -A.P.P.L.E. Editorial Dept., 21246 68th Ave. S., Kent WA 98032.

WHO LIKES THE CIA ?



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ProDOS Profiles

Ken Kashmarek

EARLIER this year, Apple Computer began distributing ProDOS, a new operating system for Apple II+ (64K), //e, and //c computers. Unfortunately, the early versions of ProDOS were only available if you bought a new disk drive, or an Apple //e equipped with a disk drive. As such, you could not get any ProDOS documentation. A.P.P.L.E. began delivering ProDOS products before ProDOS was generally available for users who wanted to obtain the software without buying a disk drive. This made it somewhat difficult to make effective use of the new A.P.P.L.E. products, ApMail.Pro and ProZap. This article will attempt to answer some ProDOS questions and some ApMail.Pro questions.

Why did Apple Computer develop ProDOS?

ProDOS was developed for several reasons. One was to provide compatibility with Apple /// files. This allows data to be shared between Apple /// and Apple II computers (//e amd II+). ProDOS also allows larger files than DOS 3.3, up to 16 megabytes. Thus, with ProDOS. the Apple // computers can support very large data bases. Of course, large data bases also mean larger disk drives. ProDOS supports different devices without modification to the operating system. With the Profile //e interface card, ProDOS will use the 5 megabyte Profile hard disk from Apple Computer. ProDOS will use other disk drives as long as the controller board meets ProDOS and Apple Computer specifications.

Since the Lisa operating system is based on a version of SOS, which is the Apple /// operating system, I expect that some ProDOS files will also be compatible with the Lisa and Macintosh. Although there is little information on the subject, ProDOS may be required for connection to Applebus or the Apple Cluster Controller (interfaces have been announced for Macintosh and Lisa).

ProDOS also supports interrupt-driven devices. This, and other changes allow for growth in the Apple // computer family, something that was restricted by DOS 3.3. Support for future disk drives from Apple Computer will be automatic with ProDOS (perhaps the Macintosh micro-floppy on the //e). Future software for the//e and //c will be based on ProDOS (we can expect a ProDOS based version of Pascal also).

Does ProDOS support the Slot and Drive parameters?

The Slot and Drive parameters are still available under ProDOS. ProDOS makes use of the volume name to find a file. When searching for a file, ProDOS will search all disk drives until the matching volume is found. Therefore, a diskette need not be located in any specific Slot or Drive. ProDOS will find the diskette by volume name if the diskette is online. You should not code Slot and Drive in your applications under ProDOS.

Beware! ProDOS is much faster than DOS 3.3 when checking a drive to determine if a diskette is ready to be used. ProDOS will not generate "I/O ERROR" if it determines that a diskette is not in the drive. Instead, "PATHNAME NOT FOUND" will be issued. So be certain that your diskette is in the drive and the drive is ready (door closed) before ProDOS attempts to access the drive. There is an advantage to this new technique. ProDOS does not beat your disk drive to pieces when a diskette is not ready in the drive. DOS 3.3 attempted to tear the drive apart first before getting an I/O error (or at least it sounded that way).

How are ProDOS files allocated?

ProDOS files are allocated in blocks. Each block is 512 bytes long and, takes two 256 byte sectors. A seedling file takes one block, which is pointed to by the catalog entry for the file. A sapling file takes one index block (equivalent of a track/sector list) and has up to 256 data blocks. The catalog entry points to the index block. A tree file has a master index block which points at up to 128 index blocks, where each index block points to 256 data blocks. The maximum file size is 16,777,218 bytes (128 times 256 times 512). The catalog entry for a tree file points to the master index block.

ProZap has a utility which will handle conversion from track sector values to block values and vice versa (hexadecimal and decimal). Using ProDOS via the machine language interface (MLI), you can read DOS 3.3 diskettes by block number. With some effort, an application can handle both ProDOS and DOS 3.3 diskettes (the ProDOS CONVERT program provides this function).

What is a pathname?

A pathname is the ProDOS version of a file name. A pathname may be a "complete" or a "partial" pathname. A complete pathname completely describes a file under ProDOS. It has two forms:

/volumename/filename

or

/volumename/directory/filename

In the second form above, DIRECTORY may be one or more ProDOS directory levels. Each part of a path-

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☐ SCARUP	CARPENTER II UPGRADE	$10.00	0	1
☐ SMACC	BIG MAC.C	$40.00	1	0
☐ SDIC	DICE	$12.50	0	2
☐ STITMA	TITLE MASTER	$20.00	0	8
☐ STITWR	DIRECTORY TITLE WRITER	$15.00	0	2
☐ SD6B	DISKPAK 6B-16	$18.50	0	1
☐ SEAP	E-Z PILOT	$28.50	0	4
☐ SCPM	FLASHCARD/SSD CP/M DISK	$30.00	0	1
☐ SDOS	FLASHCARD/SSD DOS DISK	$30.00	0	1
☐ SPAS	FLASHCARD/SSD PASCAL DISK	$30.00	0	1
☐ SFTALB	THE FONT ALBUM	$12.50	0	2
☐ SHFI	HIGHER FONTS #1	$13.00	0	1
☐ SHTP	HIGHER TEXT PLUS	$27.50	0	4
☐ SHIGRA	HIGHER GRAPHICS II	$15.00	0	8
☐ SIMAGI	IMAGINATOR	$60.00	2	0
☐ SDISRE	LIFESAVER	$21.00	0	5
☐ SQDRAW	LISA QUICK DRAW DEMO	$39.50	0	2
☐ SMCPDS	MAC-PDS #1	$7.00	0	1
☐ SMCKNF	MAC THE KNIFE - VOL. #1	$29.00	0	9
☐ SCALST	MICRO PRO: CALCSTAR	$115.00	2	0
☐ SDATST	MICRO PRO: DATASTAR	$200.00	5	0
☐ SINFST	MICRO PRO: INFOSTAR	$295.00	8	0
☐ SMAILM	MICRO PRO: MAILMERGE	$175.00	3	0
☐ SREPST	MICRO PRO: REPORTSTAR	$205.00	6	0
☐ SSPEST	MICRO PRO: SPELLSTAR	$147.00	2	0
☐ SSTIND	MICRO PRO: STARINDEX	$115.00	2	0
☐ SSUPSO	MICRO PRO: SUPERSORT	$147.00	3	0
☐ SUWTR+	MICROWRITER //	$12.50	0	1
☐ SMUL	MULTI-TRIEVE	$50.00	0	9
☐ SMULUP	MULTI-TREIVE 1.4 Upgrade	$10.00	0	5
☐ SPGE	PROGRAM GLOBAL EDITOR	$18.50	0	2
☐ SPLE	PROGRAM LINE EDITOR	$15.00	0	3
☐ SPZAP	PROZAP	$25.00	0	3
☐ SPDS	PUBLIC DOMAIN SOFTWARE	$5.00	0	1
☐ SS70	SOFT SEVENTY	$20.00	0	3
☐ SSTAGU	STARGAZER'S GUIDE	$15.00	0	8
☐ SSYM	SYMBOL SYMON	$20.00	0	3
☐ STSS	THE SPREADSHEET	$65.00	2	0
☐ STSC	THE SPREADSHEET 1.0 to 2.0 FILE CONVERTER	$5.00	0	1
☐ SCHEER	/// CHEERS (1 year)	$40.00	0	4
☐ SCHE1	/// CHEERS (Summer 84)	$12.50	0	1
☐ SCHE2	/// CHEERS (Fall 84)	$12.50	0	1
☐ SCHE3	/// CHEERS (Winter 84)	$12.50	0	1
☐ SCHE4	/// CHEERS (Spring 85)	$12.50	0	1
☐ STUR	TURTLESOFT	$22.50	0	8
☐ SDAN	VERBATIM DISK DRIVE ANALYZER	$32.00	0	9
☐ SVOLKS	VOLKSFILER	$12.50	0	2
☐ SPWORD	WORDSTAR + StarCard	$325.00	8	0
☐ SPINFO	INFOSTAR + StarCard	$325.00	8	0
☐ SPWSOP	PROF. OPTIONS PACK	$195.00	3	0
☐ SPWSPR	WORDSTAR PROFESSIONAL	$450.00	9	0
☐ SZARII	ZARDAX II (Apple II family)	$160.00	2	0
	ANTHOLOGY DISKETTES			
☐ SA1	VOL 1 (JAN-JUN 79)	$12.50	0	1
☐ SA2	VOL 2 (JUL-DEC 79)	$12.50	0	1
☐ SA3	VOL 3 (JAN-JUN 80)	$12.50	0	1
☐ SA4	VOL 4 (JUL-DEC 80)	$12.50	0	1
☐ SA5	VOL 5 (JAN-JUN 81)	$12.50	0	1
☐ SA6	VOL 6 (JUL-DEC 81)	$12.50	0	1
☐ SA7	VOL 7 (JAN-JUN 82)	$12.50	0	1
☐ SA8	VOL 8 (JUL-DEC 82)	$12.50	0	1
☐ SA9A	VOL 9A (JAN-MAR 83)	$12.50	0	1
☐ SA9B	VOL 9B (APR-JUN 83)	$12.50	0	1
☐ SA10A	VOL 10A (JUL-SEP 83)	$12.50	0	1
☐ SA10B	VOL 10B (OCT-DEC 83)	$12.50	0	1
☐ SA11A	VOL 11A (JAN-MAR 84)	$12.50	0	1
☐ SA11B	VOL 11B (APR-JUN 84)	$12.50	0	1
☐ SPA1	PASCAL ANTHOLOGY #1 (JAN-DEC 81)	$12.50	0	1
☐ SMO184	DISK OF THE MONTH 01/84	$11.00	0	1
☐ SMO284	DISK OF THE MONTH 02/84	$11.00	0	1

SOFTWARE

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ SMO384	DISK OF THE MONTH 03/84	$11.00	0	1
☐ SMO484	DISK OF THE MONTH 04/84	$11.00	0	1
☐ SMO584	DISK OF THE MONTH 05/84	$11.00	0	1
☐ SMO684	DISK OF THE MONTH 06/84	$11.00	0	1
☐ SMO784	DISK OF THE MONTH 07/84	$11.00	0	1
☐ SMO884	DISK OF THE MONTH 08/84	$11.00	0	1
☐ SMO984	DISK OF THE MONTH 09/84	$11.00	0	1
☐ SM1084	DISK OF THE MONTH 10/84	$11.00	0	1
☐ SM1184	DISK OF THE MONTH 11/84	$11.00	0	1
☐ SM1284	DISK OF THE MONTH 12/84	$11.00	0	1

VALUESOFT

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ SCATKI	CATER KILLER	$12.50	0	2
☐ SDOSAN	DISK ANALYZER 1.3	$12.50	0	2
☐ SFARWO	FARWORD	$12.50	0	2
☐ SGRAFM	GRAFMAGIC	$12.50	0	2
☐ SGRABU	GRAPHICS BUILDER	$12.50	0	2
☐ SMICWT	MICROWRITER //e	$12.50	0	2
☐ SMORTG	MORTGAGES, DEPREC. AND FINANCIAL CALCULATIONS	$12.50	0	2
☐ SGRADE	SCHOOLHOUSE GRADER	$12.50	0	2
☐ SSCRAM	SCRAMBLER	$12.50	0	2
☐ SWICWA	WICKERWARE #1	$12.50	0	2
☐ SZAPT	ZAPT	$12.50	0	2

GAMES

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ SBOLO	BOLO	$15.00	0	8
☐ SBUZBT	BUZZARD BAIT	$15.00	0	3
☐ SCCO	COSMIC COMBAT	$12.50	0	1
☐ SCRIMS	CRITICAL MASS	$15.00	0	3
☐ SD7	DISKPAK 7	$17.50	0	2
☐ SEAMON	EAMON DISK	$5.00	0	1
☐ SFREFL	FREE FALL	$15.00	0	2
☐ SFLYWS	FLY WARS	$15.00	0	4
☐ SJELLY	JELLY FISH	$15.00	0	2
☐ SKOALA	KOALAGRAMS SPELLING I	$31.50	0	3
☐ SMIC	MICROBE	$30.00	1	0
☐ SMINOT	MINOTAUR	$15.00	0	2
☐ SMCU	MUMMY'S CURSE	$12.50	0	1
☐ SPENST	PENSATE	$28.00	0	3
☐ SPLASM	PLASMANIA	$15.00	0	3
☐ SREPTN	REPTON	$15.00	0	3
☐ SSNABT	SNAKE BYTE	$15.00	0	2
☐ SSPI	SPIDER EATER	$24.00	0	3
☐ STHB	THUNDERBOMBS	$16.00	0	4
☐ STRA	TRANSYVANIA	$25.50	0	4
☐ STWERP	TWERPS	$15.00	0	2
☐ SUBCOM	U-BOAT COMMAND	$12.50	0	8
☐ SXYPHS	XYPHUS	$28.00	0	4

HARDWARE

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ HSRMON	AMBER MONITOR (12")	$100.00	17	0
☐ HAPC	AP CONTROLLER	$85.00	0	4
☐ HAKK	AP COOL KIT	$25.00	2	0
☐ HAPD	AP DRIVE	$225.00	6	0
☐ HLC1	AP.LCASE 1	$30.00	0	2
☐ HLC1A	AP.LCASE 1 w/ DICE	$37.50	0	3
☐ HLC2	AP.LCASE 2	$25.00	0	1
☐ HLC2B	AP.LCASE 2 w/ DICE	$30.00	0	2
☐ HAUD	APPLESURANCE	$85.00	1	0
☐ H80C	APPLE //e 80 COLUMN CARD	$120.00	0	4
☐ HRENUM	APU-2	$29.00	0	3
☐ HBASF	BASF 3.5" MICRO-FLOPPY (BOX 5)	$22.50	0	7
☐ HDBA	DISK BANKS	$4.50	1	0
☐ HDJA	DISKETTE JACKETS	$010	0	1
☐ HGEN10	DISKETTES-GENERIC (BULK 10)	$19.00	0	8
	(set of 100)	$150.00	5	0
☐ HVEB	DISKETTES-VERBATIM (10 BOX)	$25.00	1	0
☐ H2CCBL	DRIVE ADAPTOR //c	$15.00	0	3
☐ HMPC	DUMPLING GX	$130.00	1	0
☐ HMPD	DUMPLING 16	$180.00	1	0
☐ HDUST	DUST COVER	$8.00	0	7
☐ HSSD	FLASHCARD/SSD 294K	$525.00	2	0
☐ HSSS	FLASHCARD/SSD 147K	$345.00	2	0
☐ HSSU	FLASHCARD 147K UPGRADE KIT	$200.00	0	2
☐ HFLS	FLIP SORT DISK ORGANIZER	$22.50	3	0
☐ HGRAAP	GRAPHITTI-APPLE DMP	$90.00	2	0
☐ HGRACI	GRAPHITTI-C.ITOH/NEC/PRO	$90.00	2	0
☐ HGRAEP	GRAPHITTI-EPSON/PANASON.	$90.00	2	0
☐ HGRAID	GRAPHITTI-IDS	$90.00	2	0

HARDWARE

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ HGRAOK	GRAPHITTI-OKIDATA	$90.00	2	0
☐ **HHOC**	**HOME CONTROLLER**	**$40.00**	**0**	**8**
☐ **HPAD**	**KOALA PAD TOUCH TABLET**	**$95.00**	**2**	**0**
☐ **HKOA2C**	**KOALA PAD TOUCH TABLET FOR //c**	$95.00	2	0
☐ HMCCVR	MAC COVERS	$25.00	2	0
☐ HJMACH	MACH III JOYSTICK FOR][+	$44.00	1	0
☐ HJOMA3	MACH III JOYSTICK FOR //e	$49.00	1	0
☐ HJOYST	MACH II JOYSTICK FOR][+	$34.00	1	0
☐ HMACPK	MACPAK	$6495	6	0
☐ HMAGPH	MAGICPHONE	$180.00	3	0
☐ HDSMT3	MEDIA MATE 3	$12.99	2	0
☐ HDMEMO	MEMOREX 3.5" MICRO-FLOPPY (BOX 10)	$44.00	1	0
☐ HTDSDR	MICRO DRIVE][+, //e	$210.00	5	0
☐ HTDS2C	MICRO DRIVE //c	$225.00	5	0
☐ HMOBII	MOCKINGBOARD][+, //e	$165.00	2	0
☐ HMOB2C	MOCKINGBOARD //c	$165.00	3	0
☐ HMOD2E	MULTIMODEM //e	$275.00	3	0
☐ HPADDL	PADDLE-ADAPPLE	$25.00	0	5
☐ HPANMO	PANASONIC COLOR MONITOR	$279.00	23	0
☐ HPANPR	PANASONIC KX1090 PRINTER	$325.00	20	0
☐ HPANPT	PANASONIC KX-1091 PRINTER	$369.00	20	0
☐ HPANRI	PANASONIC RIBBONS	$14.00	0	5
☐ HSERIN	PANASONIC RS232 SERIAL OPTION	$85.00	1	0
☐ HPOST2	POSTER (Feb84) Cover	$995	0	2
☐ HPOWSU	POWER SUPPLY (II,][+,//e)ct4$85.00		3	0
☐ HPRC	PRINTER RIBBON PROW/NEC/AP/DMP	$495	0	3
☐ HTRC	PRINTER RIBBON TALLY MT 160L	$12.50	0	7
☐ HTRI	PRINTER RIBBON TALLY MT 180L	$17.00	1	0
☐ HPRMOD	PROMODEM 1200	$450.00	6	0
☐ HPRO2C	PROMODEM 1200 //c	$450.00	7	0
☐ HPRPAK	PRINTPAK	$34.00	3	0
☐ HPRT	PROWRITER PRINTER	$380.00	24	0
☐ HP11	PROTOTYPING BOARD 11"	$21.00	0	5
☐ HP16	PROMETHEUS 16K RAM CARD	$55.00	0	8
☐ HP28	PROMETHEUS 128K RAM CARD	$295.00	1	0
☐ HRIGNO	RIGHT NOTCH	$15.00	0	2
☐ HRPT	REPEATERRR	$25.00	0	5
☐ HSOFTC	SOFTCASE	$39.00	3	0
☐ HSUPMO	SUP'R MOD	$60.00	2	0
☐ HFAN	SUPER FAN II	$79.00	3	0
☐ HTSHL	T SHIRT:LARGE	$1095	0	5
☐ HTSHM	T SHIRT:MEDIUM	$1095	0	5
☐ HTSHS	T SHIRT:SMALL	$1095	0	5
☐ HTSHX	T SHIRT:XLARGE	$1095	0	5
☐ HTR120	TRANSTAR 120 PRINTER	$559.00	23	0
☐ HPAG	TYPING AID	$13.00	2	0
☐ HULTRA	THE ULTRATERM	$249.00	2	0
☐ HURB	ULTRA ROM BOARD/EDITOR	$149.00	2	0
☐ HVIE80	VIEWMASTER 80 COL. CARD	$149.00	2	0
☐ HVRC	VERSACARD (NO CABLE)	$150.00	1	0
☐ HVRC1	w/ 6' Parallel Cable	$160.00	2	0
☐ HVRC2F	w/ 6' Female Serial Cable	$160.00	2	0
☐ HVRC2M	w/ 6' Male Serial Cable	$160.00	2	0
☐ HVRC3F	w/ 1' Female Serial Cable	$160.00	2	0
☐ HVRC3M	w/ 1' Male Serial Cable	$160.00	2	0
	Cables Only			
☐ HVPC	6' Parallel Cable	$20.00	0	4
☐ HVSLF	6' Female Serial Cable	$20.00	0	4
☐ HVSLM	6' Male Serial Cable	$20.00	0	4
☐ HVSSF	1' Female Serial Cable	$20.00	0	2
☐ HVSSM	1' Male Serial Cable	$20.00	0	2
☐ HVPRAP	VERSACARD PROM APPLE DMP	$30.00	0	3
☐ HVPRCI	VERSACARD PROM PROW/NEC/C.ITOH	$30.00	0	3
☐ HVPREP	VERSACARD PROM EPSON/PANASON.	$30.00	0	3
☐ HVPRID	VERSACARD PROM IDS	$30.00	0	3
☐ HVPROK	VERSACARD PROM OKIDATA	$30.00	0	3
☐ HVIDIN	VIDEX UNIPRINT PARALLEL PRINTER INTERFACE	$74.00	1	6
☐ HZARKY	ZARDAX KEYBOARD CONNECTOR	$7.00	0	5

Use Order Form on Reverse

A.P.P.L.E. Products (Available to members only)

A.P.P.L.E. LIBRARY

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ MM-A80	*Call-A.P.P.L.E.* March/April 80	$2.00	0	8
☐ MMAY80	*Call-A.P.P.L.E.* May 80	$2.00	0	8
☐ MJUN80	*Call-A.P.P.L.E.* June 80	$2.00	0	8
☐ MN-D80	*Call-A.P.P.L.E.* NOV/DEC 80	$2.00	0	8
☐ MJAN81	*Call-A.P.P.L.E.* January 81	$2.50	0	8
☐ MFEB81	*Call-A.P.P.L.E.* February 81	$2.50	0	8
☐ MM-A81	*Call-A.P.P.L.E.* March/April 81	$2.50	0	8
☐ MMAY81	*Call-A.P.P.L.E.* May 81	$2.50	0	8
☐ MJUN81	*Call-A.P.P.L.E.* June 81	$2.50	0	8
☐ MJ-A81	*Call-A.P.P.L.E.* July/AUG 81	$2.50	0	8
☐ MSEP81	*Call-A.P.P.L.E.* September 81	$2.50	0	8
☐ MOCT81	*Call-A.P.P.L.E.* October 81	$2.50	0	8
☐ MN-D81	*Call-A.P.P.L.E.* NOV/DEC 81	$2.50	0	8
☐ MJAN82	*Call-A.P.P.L.E.* January 82	$2.50	0	8
☐ MFEB82	*Call-A.P.P.L.E.* February 82	$2.50	0	8
☐ MMAR82	*Call-A.P.P.L.E.* March 82	$2.50	0	8
☐ MAPR82	*Call-A.P.P.L.E.* April 82	$2.50	0	8
☐ MMAY82	*Call-A.P.P.L.E.* May 82	$2.50	0	8
☐ MJUN82	*Call-A.P.P.L.E.* June 82	$2.50	0	8
☐ MJUL82	*Call-A.P.P.L.E.* July 82	$2.50	0	8
☐ MAUG82	*Call-A.P.P.L.E.* August 82	$2.50	0	8
☐ MSEP82	*Call-A.P.P.L.E.* September 82	$2.50	0	8
☐ MOCT82	*Call-A.P.P.L.E.* October 82	$2.50	0	8
☐ MNOV82	*Call-A.P.P.L.E.* November 82	$2.50	0	8
☐ MDEC82	*Call-A.P.P.L.E.* December 82	$2.50	0	8
☐ MJAN83	*Call-A.P.P.L.E.* January 83	$2.50	0	8
☐ MFEB83	*Call-A.P.P.L.E.* February 83	$2.50	0	8
☐ MMAR83	*Call-A.P.P.L.E.* March 83	$2.50	0	8
☐ MAPR83	*Call-A.P.P.L.E.* April 83	$2.50	0	8
☐ MMAY83	*Call-A.P.P.L.E.* May 83	$2.50	0	8
☐ MJUN83	*Call-A.P.P.L.E.* June 83	$2.50	0	8
☐ MJUL83	*Call-A.P.P.L.E.* July 83	$2.50	0	8
☐ MAUG83	*Call-A.P.P.L.E.* August 83	$2.50	0	8
☐ MSEP83	*Call-A.P.P.L.E.* September 83	$2.50	0	8
☐ MOCT83	*Call-A.P.P.L.E.* October 83	$2.50	0	8
☐ MNOV83	*Call-A.P.P.L.E.* November 83	$2.50	0	8
☐ MDEC83	*Call-A.P.P.L.E.* December 83	$2.50	0	8
☐ MJAN84	*Call-A.P.P.L.E.* January 84	$3.00	0	8
☐ MFEB84	*Call-A.P.P.L.E.* February 84	$3.00	0	8
☐ MMAR84	*Call-A.P.P.L.E.* March 84	$3.00	0	8
☐ MAPR84	*Call-A.P.P.L.E.* April 84	$3.00	0	8
☐ MMAY84	*Call-A.P.P.L.E.* May 84	$3.00	0	8
☐ MJUN84	*Call-A.P.P.L.E.* June 84	$3.00	0	8
☐ MJUL84	*Call-A.P.P.L.E.* July 84	$3.00	0	8
☐ MAUG84	*Call-A.P.P.L.E.* August 84	$3.00	0	8
☐ MSEP84	*Call-A.P.P.L.E.* September 84	$3.00	0	8
☐ MOCT84	*Call-A.P.P.L.E.* October 84	$3.00	0	8
☐ MNOV84	*Call-A.P.P.L.E.* November 84	$3.00	0	8
☐ MDEC84	*Call-A.P.P.L.E.* December 84	$3.00	0	8
☐ PACD	APPLE II CIRCUIT DESCRIPTION	$18.50	3	0
☐ PAO1	APPLE ORCHARD #1	$1.00	1	0
☐ PASL	ASSEMBLY LINES: THE BOOK	$17.00	1	0
☐ PBAD	BENEATH APPLE DOS	$17.00	1	0
☐ PAPP2C	GOING PLACES WITH THE APPLE *//c*	$325	0	7
☐ PAPALM	THE APPLE ALMANAC	$17.50	2	0
☐ PAPCON	THE APPLE CONNECTION	$1295	2	0
☐ PAPHDB	THE APPLE II BASIC HANDBOOK	$1295	1	0
☐ PELA	THE ELEMENTARY APPLE	$11.00	1	0
☐ PAUTGU	SOFTWARE AUTHOR'S GUIDE	$17.50	2	0
☐ PDBII	UNDERSTANDING DBASE II	$1995	2	0
☐ PID1I	IN DEPTH VOL #1 (APPLESOFT)	$7.00	1	0
☐ SIN1	IN DEPTH DISK #1 (APPLESOFT)	$16.50	0	1
☐ PID2I	IN DEPTH VOL #2 (PASCAL)	$11.00	2	0
☐ SIN2	IN DEPTH DISK #2 (PASCAL)	$20.00	0	3
☐ PID3I	IN DEPTH VOL #3 (DOS)	$13.50	2	0
☐ SIN3	IN DEPTH DISK #3 (DOS)	$15.00	0	2
☐ PID4I	IN DEPTH VOL #4 (APPLEWRITER *//e*)	$12.50	1	0
☐ PIMAGS	IMAGINATOR SOURCE LISTING	$30.00	1	0
☐ PKID	KIDS AND THE APPLE	$14.00	2	0
☐ PMACIN	INTRODUCING THE APPLE MACINTOSH	$10.50	1	0
☐ PMAS	MICRO ON THE APPLE (3 VOL SET)	$40.00	3	0
☐ PMA1	MICRO ON THE APPLE(VOL 1)	$15.00	1	0
☐ PMA2	MICRO ON THE APPLE(VOL 2)	$15.00	1	0
☐ PMA3	MICRO ON THE APPLE(VOL 3)	$15.00	1	0
☐ PPK2	VOL II 1979 Compendium	$10.00	1	0
☐ PPK3	VOL III 1980 Compendium	$15.00	2	0
☐ PPK4	BOUND SET *Call-A.P.P.L.E.* 1981	$18.50	4	0
☐ PPK5	BOUND SET *Call-A.P.P.L.E.* 1982	$18.50	6	0
☐ PPK6	Bound SET *Call-A.P.P.L.E.* 1983	$18.50	6	0
☐ PU65	USING 6502 ASSEMBLY LANGUAGE	$17.00	1	0
☐ PWII	WOZPAK II	$10.00	1	0
☐ PWTA	WOZ TALKS (VHS video tape)	$27.50	1	0
☐ PWWA	WHAT'S WHERE IN THE APPLE	$17.00	2	0
☐ PWW2	THE GUIDE	$8.00	2	0
☐ PPLGRO	**COMPUTER PLAYGROUND**	**$8.50**	**1**	**0**

APPLE /// PRODUCTS

CODE	PRODUCT	PRICE	LBS.	OZ.
☐ HDR3	APPLE /// DISK DRIVE	$285.00	6	0
☐ SWW3	WORD WEAVER ///	$35.00	0	3
☐ SZARDA	ZARDAX/// (Apple ///)	$160.00	2	0
☐ SCALPK	CALENDAR PAK ///	$79.00	1	0
☐ SEZPIE	/// E-Z PIECES	$250.00	2	0

ORDER PRODUCTS LISTED ON REVERSE

Name _____ Membership # _____ Expiration date _____ Date _____

Address _____ City _____ State/Country _____ Zip _____ Phone _____

$3.00 Handling charge on all orders under $25.00

	CODE	PRODUCT	SHIPPING WT.	UNIT PRICE	AMOUNT
1.					
2.					
3.					
4.					
5.					
6.					

Total Shipping Weight _____ **SUBTOTAL** _____

Total Shipping Cost _____

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9/84

name is separated from the other parts by a slash (/). Each part is 1 to 15 characters with non blanks. The first part of a complete pathname is always the volume name (/VOLUME). Succeeding parts may be directory entries (/DIRECTORY) or the file name (/FILENAME). A complete pathname always begins with a slash and volume name.

A partial pathname does not begin with a slash. In order to use a partial pathname, the ProDOS prefix must be set with /VOLUME or /VOLUME/DIRECTORY. This is done by using the ProDOS PREFIX command followed by a volume name or volume name and directory name(s).

How does ApMail.Pro make use of pathnames?

ApMail.Pro is distributed on a ProDOS volume with volume name /APMAIL. This volume contains files (partial pathnames) PRODOS, BASIC.SYSTEM, CONVERT, FILER, and STARTUP. This last file is an Applesoft program which sets up ApMail. The startup file can be an Applesoft program, a binary file, or an EXEC file (text file).

The ApMail programs are stored under ProDOS directory /APMAIL. Thus, CAT/APMAIL/APMAIL will list contents of the ApMail program directory. For example, /APMAIL/APMAIL/HELLO references the ApMail HELLO program. STARTUP issues PREFIX/APMAIL/APMAIL and then RUN HELLO to begin ApMail.Pro execution.

An ApMail.Pro mailing label data base is stored under a ProDOS directory. By using directories, ApMail.Pro is able to support multiple mailing label data bases. A mailing label data base with directory /SAMPLE on the ApMail volume would have the following complete pathnames:

```
/APMAIL/SAMPLE/TITLE
/APMAIL/SAMPLE/NAMES
/APMAIL/SAMPLE/NAMES.INDEX
```

Where /APMAIL is the volume name and /SAMPLE is the data base directory name. ApMail.Pro issues PREFIX/APMAIL/SAMPLE and uses partial pathnames TITLE, NAMES, and NAMES.INDEX when ApMail is executing. If the data base is stored on a different diskette, then a different volume name is supplied during ApMail initialization . ApMail simply changes the prefix in order to access different mailing label data bases.

The volume and directory names are stored in /APMAIL/APMAIL/DATA.BASE. Entries are automatically added to this file by ApMail when new data bases are initialized.

Will a mailing label data base fit on /APMAIL?

As distributed, a data base will not fit on the /APMAIL volume. Originally, there was room for a data base of 250 names as indicated in the documentation. However, Apple Computer did not get ProDOS on the market as soon as we needed it for ApMail. Thus, at the last moment, after documentation was printed, it was necessary to add CONVERT and FILER to the diskette. This left only 4K of free space (8 ProDOS blocks, or sectors). Let us see what steps to take to remedy this situation.

First, make a copy of the /APMAIL diskette, and select option 0 (EXIT APMAIL). Then issue PRFIX/APMAIL. Now, enter -FILER ("-" is the itelligent RUN command). Use option "V" (volume commands) and then option "C" (copy volume) to create a copy of /APMAIL. At this time, you should also format a couple of blank ProDOS diskettes for other use (the "F" format command). Then, exit FILER (use ESCape and Quit) which will take you back to ApMail (again, select option 0 to exit ApMail).

Now, put away the distribution ApMail diskette, and only use the copy which you just made. Unlock and delete both FILER and CONVERT from the copy. Now, there is enough space on the /APMAIL volume to create a data base of 250 names. Alternatively, you may choose to copy FILER and CONVERT to one of your new, initialized ProDOS volumes (use the "C" for copy files).

To create a data base on a separate diskette, you must use FILER to initialize the diskette before running ApMail to build the data base. You must give ApMail the same volume name that was used when the diskette was initialized. ApMail will create the data base directory for you when initializing.

[Note: Early versions of ApMail.Pro contained some bugs that have since been corrected. If you are having problems with your version, A.P.P.L.E. will update your diskette free of charge. Return your diskette to A.P.P.L.E., c/o Walt Gardner, 21246 68th Ave. S., Kent WA 98032 with a note requesting an updated ApMail.Pro.]

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Circle 53 on Reader Service Card

A.P.P.L.E. Doctor

Bruce F. Field

I have a small correction to last month's column. It *is* possible to use a Dan Paymar lower case chip with Applewriter II. No modifications are necessary when Applewriter II starts up and asks if you have a lower case chip, simply answer yes.

RANA SPEED ADJUSTMENT

John Smyth of Clinton, Maryland sent me a letter on adjusting the speed of Rana Elite I disk drives. No one could answer his question at his User's group meeting so he called Rana and got the following information:

"Take the cover off the disk drive and find the three potentiometers. The potentiometers are the three blue, rectangular objects sitting on the circuit board. The one toward the back of the disk drive is the one you want. It will be labeled R7 or R8; you will see a set screw on the end (tipped in red paint or wax). Turning it clockwise will increase the speed." Use this in conjunction with one of the disk speed test disks—there are several public domain versions available from User's groups.

5-BIT BAUDOT BOARD

A few months ago I had a request for a serial interface board that could handle 5-bit Baudot code. George Kinal notes that Intra-Computer, 101 W. 31st Street, New York, NY (212) 947-5533 makes such a board. This board is also supported by ASCII Express-Pro in the telex mode.

PRINTER INTERFACING

Q. *Will the Orange Micro Bufferboard work with any interface cards other than Grappler?*

A. Yes, there are versions for the Epson and Apple parallel interfaces.

Q. *I am using an Apple II+ with an APIC interface card and an Epson MX with Graftrax. Is there any way to fix the APIC card to transfer graphics without buying an APIC-G card for $110.*

A. I am not familiar with the APIC card, but it is probably difficult or impossible to modify for graphics. At the very least you would have to reprogram the memory on the board which would be a job for an expert. A much easier solution is to buy one of the graphics dump programs that use your existing interface card. There are a number of these around, usually costing about $50 retail. Some of the better known ones are: Printographer, Zoom Graphix, Amperdump, and Graphtrix 1.3.

Q. *I have an Apple II+ and an Epson FX80. I find I cannot correctly print dot commands with the following: CHR $(7), CHR$(9) or CHR$(8) twice in a row. Is there a way to get around these problems.*

A. The problem is with your printer interface card. CHR$(7) is the ASCII bell character. It is apparently trapped by the card and not sent to the printer, thereby avoiding the raucous printer beeper. Not knowing what brand of interface card you have, I can't recommend an exact fix; but if you look in your interface card manual you want to find a command that disables the "intelligence" on the card. Send this command before you start your graphics (dot) characters.

CHR$(9) is used by most cards as the indicator of the start of a command to the card. Thus, the CHR$(9) and one or more following characters are interpreted as commands and not sent to the printer. Usually, if another control character is sent after the CHR$(9), that control character becomes the indicator of the start of a command. Thus, if you sent CHR$(9), CHR$(8), all succeeding CHR$(8)'s would be treated as commands. This gives us a clue as to how to send CHR$(9)—use the sequence CHR $(9), CHR$(8), CHR$(9), CHR$(8), CHR$(9). The first two characters change the command control character from 9 to 8, then the 9 can be printed, then the last two characters change the command control character back to 9 again. The only thing that gets sent to the printer in this case is the 9, so when you are counting graphics characters for the printer this only counts as one.

USING THE FLIP SIDE

Q. *Is it possible to write on the reverse side of a diskette without punching a notch on the other side of the diskette cover?*

A. Yes, if you are willing to modify your disk drive. There is a small microswitch on the left side of the drive that is open if the disk in the drive does not have a write protect tab. If you wish, you can disconnect one of the wires going to this switch, and the write protect feature will be disabled. Note that this also allows you to accidentally write onto a disk you really want protected, so use this carefully. You could add an extra switch in series with the microswitch to disable the write protect only when you wanted.

Although DOS can be modified to disregard the write protect tab, the write protect switch electrically prevents the read/write head from writing on the diskette.

DISK ARRAY FILES

Q. *I recently wrote a program which writes a whole bunch of two dimensional arrays to a data file with the WRITE command. It writes values to different places where I didn't specify. I tried to use the range and length commands but this didn't work either.*

A. There are several ways to save arrays to disk. The simplest is to use a sequential text file and using the WRITE command, print the data to the disk. In this case the numbers are written one after another in a single line as it were. It is up to you to remember the order in which they were stored and load them back into your array the same way. The Applesoft program segment below is one way to do this.

```
100     DIM A(20,5)
110     REM FILL ARRAY WITH DATA
        HERE
115     REM NOW SAVE DATA TO
        DISK FILE
120     D$ = CHR$(4)
130     PRINT D$"OPEN DATA FILE"
140     PRINT D$"WRITE DATA
        FILE"
150     FOR I = 1 TO 20
160     FOR J = 1 TO 5
170     PRINT A(I,J)
180     NEXT J : NEXT I
```

Line 130 creates a disk file called DATA FILE, but you can use whatever name you want (consistent with DOS file name requirements). Line 140 tells DOS that any subsequent printed text or numbers are to be written to DATA FILE. Then one at a time the numbers from the array are written to the disk. The order in which they are written is not important as long as you read them back in the same order in which they were written. The Applesoft program segment below will read them back.

```
200     DIM B(20,5)
210     D$ = CHR$(4)
220     PRINT D$"OPEN DATA FILE"
230     PRINT D$"READ DATA FILE"
240     FOR I = 1 TO 20
250     FOR J = 1 TO 5
260     INPUT B(I,J)
270     NEXT J : NEXT I
```

Notice that we have changed the name of the array, as there is no need to keep the same name unless you want to. What is important here is that we are reading the data back using the same FOR-NEXT loops as in the original.

It is also possible to locate the area of memory containing the array data and save this to disk as a binary file. This has the advantage of taking less disk space and loading and saving much faster. The disadvantage is that you must understand how variables and arrays are stored in Applesoft; this information is in Appendix I of the Applesoft Reference Manual.

CP/M ALTERNATES?

Q. *Instead of a Z80 card for the use of CP/M, can a card with an 8088 chip be used? An IBM buff that I know said that this will also make the Apple IIe compatible with IBM software.*

A. Using an 8088 card will make the Apple more or less (mostly less) compatible with IBM. Generally the 8088 co-processor cards claim to be MS-DOS compatible. IBM uses PC-DOS, which at the moment is very close to MS-DOS—but not everything that runs under PC-DOS will run under MS-DOS. If you have one or two selected IBM programs that you want to run on your Apple you could check them out with the co-processor card you are interested in to see if they work. It is too much to expect that most everything will run correctly or that you can get a cheap IBM this way.

MS-DOS works much the same as CP/M, but since it was written for a different microprocessor it is not at all compatible. If you want to run CP/M programs you will need a Z80 card.

BACK TO BASIS

Q. *What are the shortcomings of the BASIS computer? Especially, will it be ProDOS compatible?*

A. You have a somewhat loaded question there—what about the advantages? Two articles have appeared recently in *Call -A.P.P.L.E.* that dicuss the relative merits of the IIe and the BASIS, by Rick Sutcliffe, titled "Genetic Engineering" (Vol VI, Number 12, Dec 1983) and Cornelis Bongers, titled "ProDOS - Pros and Cons" (Vol VII, Number 5, May 1984). To my way of thinking, the biggest disadvantage is that the BASIS is not exactly IIe compatible. Therefore, as new products are introduced (i.e. ProDOS, Apple Mouse), they may or may not work with the BASIS. ProDOS (as delivered) will not boot on the BASIS; however, to make it work requires only a few simple patches (described in Cornelis Bongers article) with a disk zap program.

APPLE II COMPATIBILITY

Q. *How can you convert Apple II+ software to IIe software?*

A. Most software written for the II+ will run on the IIe without modification (although the reverse is not true). If something written on the II+ does not run on the IIe, it is probably because it is calling a machine language routine in the Monitor ROM that was modified for the IIe. Most of the documented Monitor ROM entry points were not changed in the IIe, but if your program uses a non-standard entry point problems may occur. This can be difficult to track down but you can start by comparing the assembly language listings for the two ROMs. The listings are published by Apple in the Apple Reference Manual A2L0001A (for the II+) and the Apple IIe Reference Manual Addendum: Monitor ROM Listings.

THE Spreadsheet 2.0 Update — New Address

To obtain THE Spreadsheet 2.0 update, send $10 along with your 2.0 disk to: ArtSci, 5547 Satsuma Ave., North Hollywood, CA 91601. Note that the address printed in last month's A.P.P.L.E. Doctor and in our current catalog has been changed.

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Circle 51 on Reader Service Card

Write—A.P.P.L.E.

Microsoft Mac BASIC Defended

After reading the article from July *Call–A.P.P.L.E.* about Microsoft BASIC for the Mac, I feel that I must reply in defense of Microsoft.

It seems that Tom Sethre's main gripe is the lack of a way to eject disks while in BASIC. While I agree that Microsoft should update the BASIC interpreter to include this feature for multiple disk storage and applications while running BASIC, there is a very easy solution right in the Mac users manual. On page 78 of the Mac manual it says the selected disk can be ejected by holding down the Command key and typing the letter "e." Page 99 (last paragraph) says that holding down the Command and Shift keys while typing the number 1 usually ejects the internal disk; holding them down while typing the number 2 ejects the external disk. I have tried this and it works fine while in the command mode of BASIC. There still needs to be a way to eject disks from within BASIC.

David Kelly

That's Wrong, Mr. Wright

The following is a response to Mr. William G. Wright's open letter to Software Pirates, and other comments:

Come on now, Bill! Who's choir are you preaching to? Many comments have been made about software piracy in the past, but your justification just doesn't hold any water!

Are you saying that you have NEVER exceeded 55mph? Never?

Have you rolled through a stop sign or pushed the yellow at an intersection?

Do you know of people who tape records off the radio or from friends' records? How about video from TV? HBO? Other tapes?

Now mind you, I'm not condoning "Piracy" of computer software, but rather pointing out that all things are a matter of degree. The law is the law, but lawyers and judges interpret it.

I would venture to say that the majority of computer owners have at one time or another obtained a copy of a copyrighted program from a non-authorized source. Many times this results in exposure to software that wouldn't have happened otherwise, either because the price was too high or not enough was known about the software. Occasionally a sale will result of the original product after viewing a copy in order to obtain the documentation, updates and corrections offered by the publisher.

Is this justification for piracy? No, not in the sense of acquiring copyrighted software for a gain. But again, to the degree that almost everyone will have copied something at least once, we certainly can't jail everyone for what should be looked at as a minor infraction.

How to cope with piracy? Enforce copyright laws where they will do the most good. Go after the big guy... the ones really out for personal gain who sell outright copies. Copy protection has its place against the casual copier as a negative incentive; although with the copy boards and nibble copiers around, it won't stop the determined hacker.

I must say that I support the policies of those publishers who sell unprotected software, as it's certainly easier to make back-up copies. But if worried about unauthorized distribution, why not just include a back-up copy in the original purchase? The costs of disks these days is miniscule compared to constantly looking for a better protection scheme/nibble technique. That way, you'd know for sure that the only people utilizing nibble copiers and copy boards were those making copies for unauthorized purposes, wouldn't you?

I understand that copy protection may be headed in that direction with so-called hard errors on original disks. I would support this concept as long as backup copies are included in the original package.

I would rate my ethical standards with the best, Mr. Wright, but I can't go along with your conclusions. If I did, and others did the same, I think the industry would be a lot smaller in scope with less variety in software available/purchased by the public.

Mike Ungerman

Computer Education and Personal Values

This letter is in reply to the letter by Pax Nidorf under the heading "Computers and Education." I certainly agree that the educational ideal and reality are often far apart. A continual monitoring of the educational system is needed in order to work out problems and improve and update it.

In spite of this fundamental agreement, I disagree with much of what is

said in the letter. I believe that learning facts is a very important and fundamental part of education. Although memorizing the countries of South America may not be among the most important facts a child learns in school, I would not propose excluding that from a child's education. Ninety-nine percent of the children will forget the countries before the semester ends, but it just might be an important part of the education of the future Ambassador to Bolivia.

I am very aware of the problem of teachers imposing a value system on my child. However, I do not believe that teaching a child there are no "shoulds" or "shouldn'ts" is the same as avoiding the teaching of a value system. Rather it teaches that his beliefs are the ultimate truth in this universe, that the student has the capacity to determine good and evil without regard to any existing value systems. It denies the existence of God and the possibility of there being any absolute laws of good and evil. Personally I do not want to teach my children that value system.

Parents should accept responsibility for the education and the value system of their children. They need to know what is happening in the schools their children attend. If educational software is to become part of our educational system, it should look for innovative and creative ways to teach children facts that are pertinent to life today. It should hold the interest of students and allow them to learn at their own pace. If it reaches the point of being a major contributor to education, it will also teach a portion of the student's value system. Parents must monitor the software used by children if they want to avoid having them exposed to value systems different from their own.

Mark O. Johnson
P.O. Box 3092
Federal Way, WA 98063

Pascal—Lost But Not Forgotten

What ever happened to Apple Pascal? Looking at the last six months or so of *Call -A.P.P.L.E.*, one would hardly know it existed. The one article you published made the questionable assertion that turtlegraphics was too complex for high school students. Worse still, your recent issue on computer languages didn't have even one article on Pascal. This attitude toward Pascal is just not supportable. There are three versions of Pascal that run on Apple II and /// series computers: UCSD Pascal IV, Apple Pascal 1.1, and Turbo Pascal (I know this one requires a Z-80 card, but it is an excellent Pascal anyway). There are even more if you count the versions of UCSD Pascal IV that require some kind of co-processor.

The omission is all the more grievous when you consider the importance of Pascal to computing and computing education. That fact was recognized when the Educational Testing Service announced that its computer science questions will be based on a knowledge of Pascal. Moreover, Apple has just released a new and updated version of Pascal.

End the conspiracy of silence! There are some Pascal (and even Modula-2) enthusiasts out here.

Scott Locicero

[Ed. Note: Although some computer experts claim that Pascal's importance as a language may have already peaked, we are far from ready to write its obituary. In fact, we have been saving up a number of Pascal-related articles for a special focus in next month's issue, and continued attention thereafter. Do not fear, the Pascal drought will end.]

Plain Plane BBS

Our Apple Computer User Group in southern Kansas has been running a BBS for some time now. Because this is a free service open to any caller, your readers may be interested in the following information:

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Ralph E. Wasmer
Chairman, Steering Committee
Plane APPLE Club

Hilbert Encore

To Don Williams:

I enjoyed your article on Hilbert very much (*Call -A.P.P.L.E.*, July 1984) and was dismayed to see the Macintosh turning in such a dismal performance via Microsoft BASIC and MacPascal. Of course these are interpreted languages, and at least they beat out the other interpreted languages.

However, curiosity got the best of me, and before I knew it I was writing up Hilbert on my Lisa development system, in Lisa Pascal, to run on the Mac.

Then I timed it, and I'm sure you'll be glad to know that it beat every other contestant—except your hand-coded assembly routine, which ran about two times faster than the Mac version.

I guess all we have to do now is persuade you to learn 68000 assembler, and really watch Hilbert blaze away.

Geoff Puterbaugh

from our mouse to yours...

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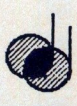

Circle 48 on Reader Service Card

Very Special Applications

Dear Members of A.P.P.L.E.,

At an eastern university, a young paraplegic woman learns to walk again with the assistance of impulse-relay braces and a program which analyzes muscle response that runs on an Apple. In the heartland of America, farmers realize increased crop yield, making strides in water rotation and soil conservation with the Apple. And in an era of re-usable spacecraft, the Apple has already made a trek out of this world. To the individuals who benefit from these special applications, the microcomputer must seem nothing short of miraculous. Yet, in a much broader sense, this technology is impacting our world and the brotherhood of man in a profound and positive manner. The microcomputer is truly enriching our lives, making contributions to mankind that enhance not only our quality of life, but modern society as well.

We A.P.P.L.E. members all have something in common, regardless of each one's level of computing sophistication. That great common thread is our mutual interest in the proliferation of a technology which is changing how we relate to business, education, science, art, and information use in general. Yet, the commercial evolution and mainstream acceptance of the microcomputer is painfully slow. Standardization within the manufacturing community continues to lag, consumer fear and economic barriers persist, quality control and compatibility are eternal issues. Those who market machines, software, peripherals, products and—like A.P.P.L.E.—services, continue to jockey for positions of survival within the micro industry. From where we sit, the state of our industry could not be more chaotic. As this letter is being prepared at press time, official word has come that **Softalk** magazine has filed for bankruptcy.

Many members of our club are computer users and enthusiasts. Still many more are connected in some fashion to computer manufacturing, marketing, or software development. In our frustration to determine the direction and goals of an industry which so closely affects our livelihood, we mustn't obscure the ancient ritual in which we all take part—the ritual of making better tomorrows. . . ..for who we love, and the world we love. The computer has increased human resources. We all can and should take pride in that. Tenacity will pay off. Can a price be levied on a program which realizes dreams? Dreams like being able to walk again?

There are more great victories ahead.

Sincerely,

Gary M. Kruger
Publisher

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MEMBER BILLBOARD

Kaiulani Schuler

Evolution

Call -A.P.P.L.E. has undergone several changes in recent months, and members have wondered about the reasons for these changes. Our primary goal is to provide a unique and valuable service to our members as cost efficiently as possible. We are including more tutorials and increasing the readability of our articles so that even computer neophytes will feel at home in our club. We have greatly reduced costs by streamlining our typesetting procedure, bringing our production in-house, and printing locally. Each month, we explore ways of improving the aesthetic appeal and organization of Call -A.P.P.L.E.'s content. You, as a reader, can help us serve your needs.

Tell Us What You Want

Reader feedback is important to us. Rate Call -A.P.P.L.E.'s articles on the Reader's Choice Card every month and send it in. It's your chance to be heard and to win $100 credit toward any A.P.P.L.E. product. Marlin Brendsel of Baltic, South Dakota sent the winning card drawn in our June meeting and EMC John S. Jordan from Seattle, Washington was selected in July. Congratulations and thank you for your feedback!

Early Renewal Notices

As part of our efforts to operate cost efficiently, requests for early membership renewals were sent to each of you whose membership expires in December 1984. The volume of orders we receive triples in December and, due to the holidays, our hours of operation are reduced. Renewing now will lighten the burden in December and maintain a positive cash flow.

Expanding Public Domain Software

A.P.P.L.E. is planning to expand the public domain software library. This expansion will include dBASEII and other CP/M programs. Members who would like to donate dBASEII and CP/M programs should contact a dBASEII Special Interest Group member, attend a dBASEII SIG meeting, or send their contributions to Patti Hoffmann at A.P.P.L.E.

New Hotline Hours

Our Hotline hours are now 9 a.m. to 3 p.m. Monday through Friday. We have monitored usage and found our weekday hours to be of most use to our members. We will continue to monitor this service and adjust our hours in accordance with your needs.

NOTICE: Co-op Status Vote

Amendments to the articles of incorporation which have been approved by the Board of Directors permitting A.P.P.L.E. to become a cooperative under the Revised Code of Washington Chapter 24.06 shall be presented to the members for approval in the September 18th meeting at the A.P.P.L.E. office at 21246 68th Ave. S., Kent WA 98032.

A.P.P.L.E. will exhibit at the following computer fairs

Vancouver B.C.
Sept. 22nd & 23rd
Robson Square Media Center

Twin Cities Computer Show
Minneapolis, Oct. 25-28

Northeast Computer Show
Boston, Nov. 1-4

Softcon/Spring
Atlanta, March 31 - April 3, '85

THE DATA BANK™

Powerful Data Base management system. Easy to use, understandable manual, menu drive, unlocked, includes all the features most needed. Comes with 30 day return policy. For more details send for overview of the product. For APPLE II+, //e, //c, /// in E-mode. Price: $170.00

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Prints neat banners for parties, games, special occasions, or signs for bulletin boards, garage sales, store sales. It has **1001 uses.** Prints 6" or 3½" letters. Fun and easy to use. Runs on Apple II+, //e, //c, ///, Macintosh, IBMpc, PCjr. Cost $29.00

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Specify type computer when ordering, add $3.00 shipping. California residents add 6% tax.

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Apple II+, //e, //c, ///, Macintosh and IBMpc, PCjr, are trademarks of Apple Computer Inc. and IBM Corp.

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A.P.P.L.E.

Apple PugetSound Program Library Exchange

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Information not available

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(206) 872-9004
9am to 3pm
(Pacific Time)
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Meetings
7:30pm third Tuesday of each month
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Membership Information
is available on postpaid tear-off card inside

A.P.P.L.E. on the SOURCE
A special section of The Source is open only to A.P.P.L.E. members who may download Call -A.P.P.L.E. programs. To access, type: CALL-APPLE, from Source command mode. To register, send mail to ST1570 with your name, membership number, expiration date and Source account number.

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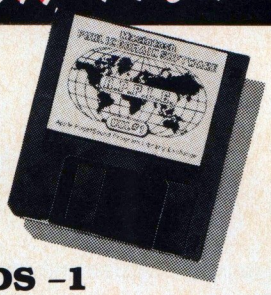
Call -A.P.P.L.E. consultants are unpaid volunteers and perform a valuable service. Before placing a call, please make sure you know the time zone you are calling to. No calls after 9pm, please.

We are always looking for more consultants. If you see an area that needs coverage, please drop us a note in the mail with your qualifications and availability.

New Products



Product Code	SMCPDS
A.P.P.L.E. Price	$7.00
Sug. Retail	N/A
Ship.Wt.	1 oz.

MAC–PDS –1

Introducing the first in our series of Public Domain programs for the Macintosh. Included are applications, BASIC programs, and games.

Product Code	HMCCVR
A.P.P.L.E. Price	$25.00
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Ship.Wt.	2 lbs.

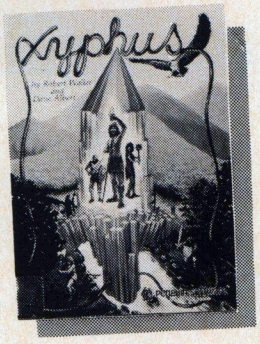
MacCovers

Attractive vinyl, cloth–backed dust covers for the Macintosh, the Mac keyboard and printer. Aids in static prevention and kid protection. 3 piece set for the Mac, keyboard, and Imagewriter.

Product Code	HDSMT3
A.P.P.L.E. Price	$12.99
Sug. Retail	$14.59
Ship.Wt.	2 lbs.

MEDIA MATE

For protecting, organizing and storing your Macintosh diskettes. Sturdy high–impact construction, attractive smoked, see–through cover, adjustable tab dividers, and case on case stackability. Holds up to 50 3½" diskettes.



Product Code	SXYPHS
A.P.P.L.E. Price	$28.00
Sug. Retail	$39.95
Ship.Wt.	4 oz.

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Enter the lost continent of Arroya in search of Xyphus, Lord of Demons. Six increasingly different scenarios, plus a wide variety of spells and weapons will perhaps make this fantasy role playing adventure like no other you've seen. Hi–res graphics. Available Oct. 1st.

Product Code	SUWTR+
A.P.P.L.E. Price	$12.50
Sug. Retail	N/A
Ship.Wt.	1 oz.

MICROWRITER II +

Here it is! The popular word processor for the *//e* is now available for the Apple II+. Easy to use. Compatible with Videoterm, Viewmaster and most other 80–column cards. Requires Apple II+ with shift–key modification and a lower case chip.

Product Code	H2CCBL
A.P.P.L.E. Price	$15.00
Sug. Retail	N/A
Ship.Wt.	3 oz.

DRIVE ADAPTOR *//c*

With this part you can adapt any Apple compatible disk drive to operate with your Apple *//c*.

Product Code	SMCKNF
A.P.P.L.E. Price	$29.00
Sug. Retail	$39.00
Ship.Wt.	9 oz.

MAC THE KNIFE Vol. 1

A treasury of art for the Macintosh with MacPaint. Over 500 useful illustrations, borders, textures, international icons, corporate logos, TWO NEW FONTS and much, much more!

Product Code	SPENST
A.P.P.L.E. Price	$28.00
Sug. Retail	$39.95
Ship.Wt.	3 oz.

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Outwit the computer's legions of pieces as you make your way across the playing board. Ten distinct types of opposing pieces provide endless variety and challenge in this game of strategy. Hundreds of levels of play with one or two player option.

APPLESOFT UTILITIES ADD–ON FOR THE ULTRA–ROM BOARD

Product Code	HRENUM
A.P.P.L.E. Price	$29.00
Sug. Retail	$35.00
Ship.Wt.	3 oz.

APU2 contains programs:

- to safely and automatically number your program lines.
- to hide one or more programs in memory.
- that show size of Applesoft program and amount of remaining free space.
- to safely insert subroutines or whole blocks from other programs quickly and easily.
- that show a list of any or all variables in an Applesoft program.
- that renumber your entire program or any portion thereof, flag references to nonexistent line numbers, print a listing of all changes made to program during renumber and much more!

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Product Code	HDSCPY
A.P.P.L.E. Price	$32.00
Sug. Retail	$39.95
Ship.Wt.	3 oz.

SMARTCOPY/APZAP contains two programs. SMART COPY copies up to 40 track disks in BASIC, Pascal, CP/M and ProDOS formats. READ, EDIT, or WRITE to any track sector. AP–ZAP is a complete menu driven disk–sector editor.

A.P.P.L.E.

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THE MARKETPLACE

The following items are selected by our editorial staff from the large number of product announcements and news releases sent to us daily. They are presented solely to keep you informed about the current market for Apple related hardware and software. As we have not tested many of these products, appearance here does not necessarily represent endorsement or recommendation by A.P.P.L.E. Watch for evaluative reviews in *Call — A.P.P.L.E.*.

APPLE RELEASES NEW APPLE WRITER II

Cupertino, CA — Apple Computer has announced an enhanced version of its popular Apple Writer II word processing software available for Apple *//e* and Apple *//c* users.

New features incorporated in Apple Writer II, Version 2.0 include:

- horizontal scrolling
- text display that lets users see the page and line count without having to print the document
- a built-in terminal mode that allows users to access information services, such as CompuServe, Dow Jones and The Source, from within Apple Writer
- a utility that enables users who do not have a ProDOS user's diskette to format a blank disk for use with the new Apple Writer II.

The new Apple Writer II can work with Apple's ProFile hard disk and Quark Inc.'s Catalyst *//e*, and is based on Apple's ProDOS operating system. Catalyst *//e* is a program selector that allows all Apple *//e* programs, including those that are copy-protected, to be stored on a hard disk. Its program-selection capability lets users move from application to application without having to restart the computer each time a program is switched. The new Apple Writer II includes a built-in Catalyst *//e* file for easy installation of the program on to the ProFile.

In addition, Apple is offering an upgrade program that allows owners of the previous version of Apple Writer *//e* to obtain the new software at a discount.

The product includes a training disk that leads new users step by step through the program.

Data files created with previous DOS 3.2-based versions of Apple Writer can be converted to the ProDOS format using a conversion utility on the ProDOS user's disk. Once they are converted, these DOS 3.3 data files will be compatible with the new Apple Writer II and data files created with it.

Price, Availability and Upgrade Program: Apple Writer II, Version 2.0 sells in the U.S. for $149, and is available after August 1, 1984 from all authorized Apple Dealers worldwide.

From August 1 until February 1, 1985, existing Apple Writer *//e* users can upgrade their software to Version 2.0 by sending their master disk, manual cover and $50 to:

Apple Computer, Inc.
Apple Writer II Upgrade
P.O. Box 306
Half Moon Bay, CA 94019

MONTHLY DISK MAGAZINE

Newport, RI — Viking Data Based Technologies, Inc. has announced the introduction of "SOFTYME," a monthly disk publication for Apple Computers. "SOFTYME" comes each month to subscribers on a disk. "SOFTYME" is written for the Apple II and *//e* with DOS 3.3 and 48K of memory. You may order the magazine on a disk by sending $48.00 for one year (12 disk/issues) to *SOFTYME, Box 299, Newport, RI 02840. (401) 849-4925/4926.*

COMPUTERS SPEAK CHINESE

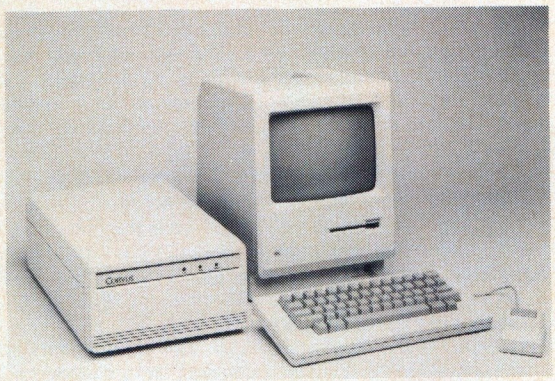
Computer terminals and printer controllers have been developed in Taiwan to accept commands, display characters and print documents — all in Chinese. Businesses, schools and government offices in all parts of Taiwan use the Dragon Terminal and Printer Controller from Multitech Industrial Corporation to process data in the world's most complex written language.

Chinese, unlike European languages, has no alphabet, but relies on a system of written characters, each of which corresponds to one word. One character is made up of a standard number of strokes, which can number as many as 32. The complexity of the Chinese written language forced researchers at Multitech, a Taiwan microcomputer manufacturer, to explore the possibility of developing a new Chinese operating system before arriving at the "terminal solution".

The Dragon Terminal contains modified firmware for processing 22,000 Chinese characters and can be immediately hooked up to almost any computer system. The Dragon Printer Controller is also easily installed for printing in Chinese.

The newest Dragon Terminal supports a body of Chinese software, which includes Chinese word processing, data base, electronic mail, graphics and financial analysis. For more information, contact: *William Lu, Multitech Industrial Corporation, International Marketing Division, 266 Sung Chiang Road, 9F, Taipei, Taiwan, R.O.C.*

MASS STORAGE FOR MACINTOSH



Las Vegas, NV — Corvus Systems, Inc. has announced a single-user version of the OmniDrive 5¼" Winchester disk storage system for Apple Computer's Macintosh personal computer. Macintosh users can now benefit from the increased mass storage capacities and rapid disk access that Winchester disks provide.

The Macintosh version of OmniDrive is available in four capacities: 5 megabytes (Mbytes) at $1,795; 11 Mbytes at $2,495; 16 Mbytes at $3,195; and 45 Mbytes at $4,995. The drives, which will begin shipping in August, will be supported by Corvus' network of independent dealers. OmniDrive is also available for a variety of personal computers including the Apple II and III.

Corvus Systems, Inc. is headquartered at *2100 Corvus Drive, San Jose, Calif. 95124.* Telephone *(408)559-7000.*

DATA COMMUNICATIONS SOFTWARE FOR THE MACINTOSH

Las Vegas, NV — Apple Computer has introduced MacTerminal, a data communications software package that allows the Macintosh personal computer to interact with mainframe and minicomputers as well as commercial electronic information services.

The software provides Macintosh users with access to the vast amount of information that businesses and colleges store on large computers. MacTerminal, available in late August, is compatible with a variety of the most widely used communications protocols.

- In business settings MacTerminal can be used to emulate IBM 3278 terminals when linked to a mainframe computer through either AppleLine (a coaxial attachment unit) or the Apple Cluster Controller (a protocol converter that emulates IBM 327-xtype cluster controllers).
- Used with an Apple modem or other compatible modem, it provides asynchronous communications through VT100, VT52, and TTY terminal emulation.
- Users also can use a modem and MacTerminal to gain access to remote information services such as CompuServe , The Source , Dow Jones News/Retrieval Service, MCI Mail, and Western Union Easy Link.

MacTerminal runs on either the Macintosh or Lisa 2, 2/5, or 2/10 computers using MacWorks, the Macintosh Operating System for the Lisa 2 family. It shares the basic characteristics of other Macintosh software—a visual user interface, integration between applications, a mouse, and the ability to view multiple objects on the screen.

The product currently is integrated with MacWrite and Microsoft Corporation's Multiplan spreadsheet program, enabling users to copy and paste between the applications. Users, for instance, can dial into CompuServe, copy the information they need, open a Multiplan document and paste the information into the spreadsheet.

MacTerminal features a file transfer capability which facilitates the transfer of text and graphics to Macintoshes or Lisas in different locations. For example, an architect needing to send a floor plan created on MacPaint to a *colleague* in another part of the country simply selects the "send file" option from the pull-down menu to initiate the transfer. The floor plan then appears as a document on the receiving architect's screen where it can be re-worked or printed out as needed.

In its terminal emulation mode, MacTerminal eliminates the multiple keystrokes normally needed to call up functions specific to mainframe applications. Instead, it provides a graphic pull-down menu that displays special function keys. The user simply opens the menu and uses the mouse to point to and select the right key. The pull-down menu displays appropriate keys for both VT100 and IBM 3278 terminal emulation.

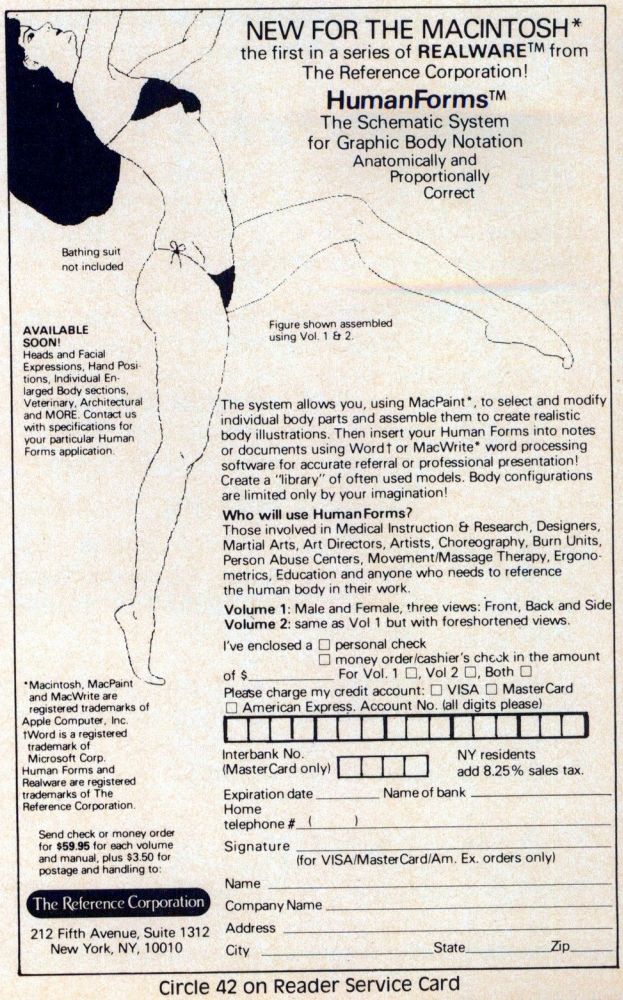
Price and Availability: MacTerminal has a suggested retail price of $99 and will be available through authorized Apple dealers.

BAR MITZVAH INSTRUCTION VIA MICROCOMPUTER

Chicago, IL — Davka Corporation, the world's largest creator of Jewish computer software, offers a personalized study course to speed up the learning process for a Bar or Bat Mitzvah. This new program, called BAR MITZVAH COMPU-TUTOR, allows the student to progress at his or her own pace and repeat the material as often as needed. The program runs on Apple II+/*II*e and Apple- compatible computers. The retail price is $49.95.

The computer plays the Haftarah melodies and a bouncing ball helps to follow every syllable—using either the Hebrew text, with vowels and "trop," or the English transliteration. Each copy of the program is customized for the student who will use it; Davka obtains the needed information from the purchaser or, especially with gift programs, gets it directly from the synagogue where the bar/bat mitzvah will be celebrated. Davka incorporates the English and Hebrew names of the student, the pronunciation (Ashkenazic or Sephardic) to be followed, and the specific Haftarah to be read into the final, personalized program version. Davka also provides an English translation of all text used, and an original commentary on the Haftarah.

BAR MITZVAH COMPU-TUTOR is an exciting Jewish educational aid, intended to serve the needs of all Jews—Orthodox, Conservative, Reform, and Reconstructionist. It is available directly from Davka, from computer stores, and from Jewish bookstores and synagogue gift shops. *Davka Corporation, 845 N. Michigan Avenue, Suite 843, Chicago, IL 60611,* is the exclusive marketing agency for programs produced by the Institute for Computers in Jewish Life.



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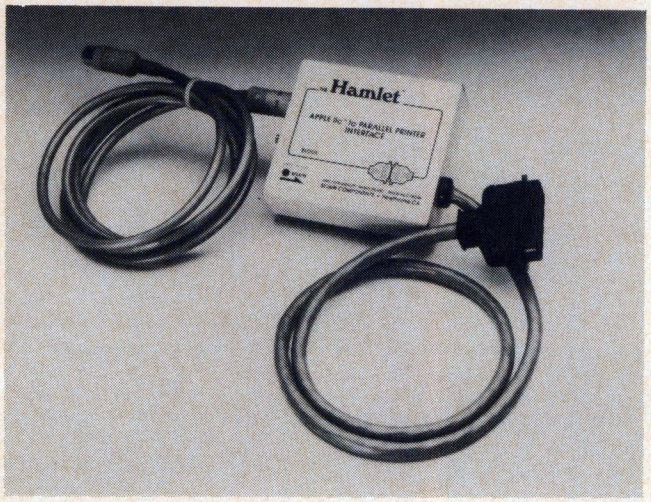
IIc PARALLEL PRINTER INTERFACE



The first Apple IIc interface for all major parallel printers is now available from Belkin Components. The new interface, named the Hamlet, just introduced by Belkin, leading manuafacturer of printer cables, opens up this market for the first time.

The interface has been tested successfully on all major printers. It comes with AC adapter and all required cables. Everything needed for installation is included in the package. The Hamlet allows an almost unlimited distance from computer to printer. It is compact and easy to keep out of the way. Suggested retail price is $98.50. *Belkin Components, 4718 W. Rosecrans, Hawthorne, CA 90250. (213) 644-3184.*

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DISKETTES

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Hard plastic stand-up 10-diskette carrying cases $2.75 each, 4 for $10 (beige, black, blue, green, grey, red, yellow). Smoked-plastic flip-top 75 diskette file cases, $19.50. Heavy-duty nibbling tool, $22.

Disk Drives

$199 100% APPLE-compatible, 40-track, full-size, Siemens type quality drives, with manufacturer's 1-year warrantee. Controller card, $65.

COD & VISA/Master Card orders welcome. Add $4 for shipping & handling (only $2 for orders under $50) plus 6% sales tax for DC residents. Send for our catalog.

VF ASSOCIATES

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Circle 44 on Reader Service Card

SUPER SCREEN DUMP

Victoria, B.C. — Mycroft-soft Software has a new software package with an ancillary piece of hardware for the Apple II+ and Apple IIe. SUPER SCREEN DUMP prints whatever is on the Apple's screen whenever the user wants (in a DOS 3.3 unprotected environment).

Users do not have to exit the program that is running at the time. They simply press a *button* and type one key to print an exact copy of the screen, which can be text, low resolution graphics, high resolution graphics, mixed graphics and text, page 1 or page 2.

SUPER SCREEN DUMP can be invoked while the users are Cataloging, Writing, Listing, Running, Brunning, etc. virtually any program from any DOS 3.3 unprotected disk, *whenever* the user wants,even if no cursor appears on the screen. It can be used with software as diverse as the Koala Microillustrator and the GPLE editor.

SUPER SCREEN DUMP also allows the user to print titles and comments with any screen that is being dumped, or to change the printer set-up at any time, even when another program is running. SUPER SCREEN DUMP supports a variety of printers, including Apple, Epson, Gemini, C.Itoh, and Okidata. The price of the product is $41.

For more information on SUPER SCREEN DUMP contact: *Schwartz Computer Consulting—Mycroft-soft Software, 3868 Cedar Hill Road, Victoria, B.C., V8P 3Z6, Canada*

DAISYWHEEL PRINTER FOR MAC

Foster City, CA — MACpac, the first letter quality daisywheel printer for Macintosh, Apple Computer's popular advanced personal computer, is now available from TTX Incorporated.

MACpac gives the Macintosh user the flexibility to print with either the Apple Imagewriter or the TTX 1014. The MACpac buffer allows both printers to be connected to the system at all times, for greater user-convenience. MACpac works with the MacWrite word processing program.

MACbuf, MACpac's 64K buffer, allows switch selection of printers, and enables the user to keep both the TTX 1014 and the Imagewriter connected at all times. MACbuf connects to the MACintosh serial port, and provides either parallel (TTX 1014) or serial (Imagewriter) output, depending upon the printer selected. MACbuf accommodates data rates of from 50 to 19.2 baud.

The buffer also makes it possible to make multiple copies of any material, automatically and off-line, so that the computer can go on to handle other productive tasks. MACpac can also be used with Macintosh alone, since the buffer converts computer output automatically to the Centronix parallel interface standard of the TTX 1014.

The TTX 1014 features a 14 7/8″ platten, bi-directional printing, pin-feed forms guide, and variable pitch and line spacing. It prints at speeds up to 14 characters per second. The TTX Sheet Feeder, priced at $399.00, is an optional accessory that holds up to 200 sheets of paper at a time, and feeds them to the printer at three inches per second.

Suggested retail price of the new MACpac is $895.00, and delivery is immediate. The package includes the TTX daisywheel printer; the 64k buffer, MACbuf; and the printer/buffer cable. Contact: *TTX Inc., 3420 East Third Ave., Foster City, CA 94404. (415) 341-1300.*

CLICKART IMAGES

ClickArt:Publications, from T/Maker Graphics, contains graphics files to aid Macintosh owners in creating and designing newsletters, announcements and flyers. The disk contains over 200 images such as illustrated alphabet letters, column headings, illustrated phrases, people, cartoons, borders and full screen portraits.

The disk also contains two-column and three-column layout files to serve as a guideline for creating newsletters. Column headings and illustrated phrases are designed to fit into either the two- or three- column format. Borders are designed so that the corners and mid-sections can be easily copied and replicated to create a border of any dimension. A thirty-two page ClickArt Tips Manual is included that offers suggestions and hints on how to really exploit ClickArt images and MacPaint/MacWrite.

For more information, contact *Robert Simon, Vice President, T/Maker Graphics,* at *(415) 962-0195.*

FORTH CONVENTION

San Carlos, CA — The FORTH Interest Group (FIG) invites you to join them at the 6th Annual FORTH Convention and Banquet on November 16-17, 1984 at the Hyatt Palo Alto in Palo Alto, California, USA. The convention will focus on the latest developments and applications of the FORTH computer language. Plans include exhibits, vendor booths, hands-on tutorials, lectures and seminars.

The FORTH Interest Group is a non-profit member-supported organization with over 4,800 members and 53 chapters worldwide devoted to the Forth computer language. FIG membership of $15.00/yr ($27.00 foreign) includes a subscription to FORTH Dimensions, the bi-monthly publication of the group.

For additional information, including special convention room rates, call the FIG HOTLINE (415) 962-8653 or write FIG, P.O. Box 1105, San Carlos, CA 94070. Convention pre-registration is $10.00 ($15.00 at the door) and the banquet is $30.00 per person.

DIAL-BACK SECURITY DEVICE

Los Angeles, CA — C.H. Systems Inc. has introduced SLEUTH, a dial-back access authenticator designed to work with the Hayes Smartmodem (300 or 1200) and several oher Smartmodem compatibles.

Installed between the computer and Smartmodem, SLEUTH prevents unauthorized use of data ports by requiring all would-be users to type in an identification and password. After receiving an identification and password SLEUTH disconnects dialer and instantly verifies authenticity. Upon validation, SLEUTH matches information received to a previously entered phone number and dials back remote user through Smartmodem and establishes normal modem connection.

SLEUTH is completely menu driven and can only be programmed at host computer site, with a special security password. It holds up to 74 names, passwords and phone numbers on a non-volatile EAROM chip. All data is retained if the power fails. The originate option prevents Smartmodem from giving "tell-tale" carrier tone to random callers or "scanners." Long distance networks (MCI, SPRINT, etc.) are supported in call-back mode. SLEUTH is totally transparent to normal outgoing calls and is compatible with all computers using standard RS-232C, with no external software needed.

The suggested retail price of $465.00 includes the unit, power supply, manual, and RS-232C cable. C.H. Systems provides a one-year unconditional warranty on parts and labor. For more information, contact *C.H. Systems Inc., 8533 West Sunset Blvd., Suite 106, Los Angeles, CA 90069, (213) 854-3536.*

SPEED UP YOUR APPLE

Here's a whole new way to speed up your Apple II, II+, IIe, or Apple III. RAMDISK 320 from Axlon.

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RAMDISK 320 is a solid state memory add on system fully compatible with Apple DOS 3.3. PRODOS, SOS, CP/M, Apple Pascal 1.1 and Pascal 4.0
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- Increases memory by 320k
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RAMDISK comes with a plug in, slot-independent interface card, a specially designed operating system, and software for diagnostics and fast load copy routines.

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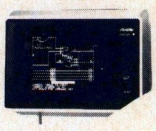

System Requirements
- 48k Apple II, II+ 11e computer
- Epson MX100 or FX100 printer with Graftrax ROM Set
- Paddle Controllers

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CHEF APPLE

Softsmith's Micro Cookbook for the Apple performs functions that ordinary cookbooks cannot. Its ability to select recipes containing specified ingredients, such as items on hand and leftovers, takes the guesswork out of turning them into a satisfying meal. With Softsmith's Micro Cookbook, it's no longer necessary to struggle with converting recipes for fewer or more servings. With the touch of a key, ingredient quantities are adjusted automatically to the number desired.

Saving time at the grocery store and helping to avoid unnecessary spending are benefits of using Micro Cookbook's innovative applications. An alphabetical shopping list can be printed merely by listing the recipes intended for use and other items needed.

Calorie and nutrition guides in Softsmith's Micro Cookbook are useful in analyzing meals. Other references are handy for substituting ingredients or converting measurements. Its indexed retrieval capability for selecting subsets of recipes allows innovative menu-planning within minutes. Suggested retail price is $40.00.

For more information, contact: *Softsmith Corporation (415) 487- 4900.*

MEGAFILER FOR THE MACINTOSH

San Diego, CA — Megahaus Corporation, publishers of MegaMerge, the mailmerge program for Apple's MacWrite, are shipping their second Macintosh product: MegaFiler. MegaFiler is a file management program that lets you file and retrieve information quickly and easily, taking full advantage of the Macintosh technology. Megafiler's list price is $195.

MegaFiler comes complete with a library of ready-made files for a host of applications, such as:

Mailing lists	Home inventory
Sales records	Stocks
Business inventory	Customer orders

. . . and more

And MegaFiler's file designer lets you create your own custom file that can contain unlimited fields arranged in any way you like. MegaFiler works with MegaMerge and Apple's MacWrite to create alphabetized mailing lists and form letters.

Contact: *Megahaus Corporation, 5703 Oberlin Drive, San Diego, CA 92121. (619) 450-1230.*

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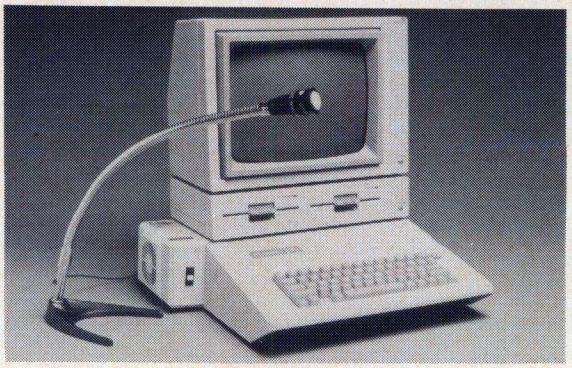
SPEECH RECOGNITION



Introvoice II, a new speech input device from The Voice Connection, Inc., works with any existing Apple II series application software including word processing, electronic spreadsheets, games or graphics. Recognition accuracy exceeds 98% for vocabularies of 160 words or more. The plug-in board with microphone and support software on diskette, allows commands and data to be input to an Apple by voice or in combination with the keyboard.

The Voice Connection's support software extends prior technology allowing a user to easily define syntax structures, the sequence in which words or phrases are joined together. Such sequences occur frequently when items are being inspected. For example, in inspection of a vehicle, first a number is given, then the defective part is identified and finally the type of defect. With syntax, Introvoice II restricts the actively recognized vocabulary, thus increasing recognition accuracy and reducing classification response time.

Introvoice II with syntax allows the same word to have multiple meanings to a microcomputer. For example, the word "ALPHA" could represent an upper case letter "A," a lower case "a" or a control key being depressed with an "A", depending upon the active syntax mode.

Introvoice II hardware and software supports unlimited vocabulary in subsets of 160 words or phrases. Additionally, a voice controlled hardware interrupt allows foreground/background programs to be controlled by voice. Other Introvoice II features include voice controlled "correction," "repeat" and a voice "on/off" switch.

The Introvoice II plug-in board contains a 16 channel audio spectrum analyzer, 16K of RAM and 8K of ROM. The unit is supplied with documentation, software and all components necessary for immediate use.

For additional information contact: *Ronald G. Runge, President (714) 261-2366,* or *Sharla Cartwright, National Accounts Manager, (714) 261-2368.*

A DATABASE FOR THE SKY BEYOND PLUTO

ASTROBASE is a mini-database system that comes with the 300 most important astronomical objects of the deep sky (beyond our solar system). You can add hundreds of more objects as desired. The 300 objects (with relevant data and descriptions) include:

* Galaxies, Open Star Clusters, Globular Star Clusters
* Emission Nebula, Dark Nebula, Planetary Nebula
* Double Stars and Variable Stars
* Quasars and other Special Objects
* All Messier and other important cataloged objects

ASTROBASE allows you to do searches for deep sky objects and display or print results. You can search by constellation, area of sky, size, brightness, type of object, etc. Also, you may input date, time and location and ASTROBASE will show which objects are currently visible in the sky as an aid to observing. You can edit all objects to add observation notes such as date, sky condition, telescope used and comments as each object is observed.

ASTROBASE comes with a 30 page manual that explains its use and provides an introduction to the astronomy of the deep sky (galaxies, nebula, etc.) and gives helpful information on telescopes and observing techniques. A very useful program for anyone interested in astronomy.

ASTROBASE is available for $29.95 directly from the publisher, *Zephyr Services, 306 South Homewood Ave., Pittsburgh, PA 15208. (412) 247-5915.*

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$8 (U.S.) INCLUDING DISK✓-Over 900 famous business, education, and game programs for II, //e. Discounted peripheral cards. Details: $1 (U.S.) to Reliant, P.O. Box 33610, Sheungwan, Hong Kong.

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PROGRAMMABLE DENTAL FLOSS is not yet available, but you can buy a couple of very nice and easy to use Ultima character editors. $9 each or $14 for both disks. Michael Scanlin, 34 Giralda, Long Beach CA 90803. Specify II or III.

TERMINAL TRIVIA—Over 1000 questions on three disk system...Choose any two 500+ question disks: SUPER POT LUCK, SPACE TREK, MOVIE and TV MARVELS, SPORTS SENSATIONALS, ROCK 'N' ROLL REVIVAL, and MORE!!! Twelve different ways to play with up to five people. TERMINAL TRIVIA Only $39.95 plus P&H. TRIVIA BUFF: Adult party version only $49.95. 30 day money back guarantee. Orders: 800-368-3238 ext.1 (MC/VISA) Info: (804) 525-3441.

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PERSONAL COMPUTER JAZZ! -over 30 minutes of new jazz arrangements for the Apple II with an ALF MC1 card. By Tony Walloch (whose beginning effort was 'FOUR BROTHERS' on the ALF demonstration disk). Send $20.00 to A.S.Walloch, P.O. Box 98564, Des Moines, WA 98188.

DON LANCASTER'S AW//e TOOLKIT—Eight diskette sides crammed full of Applewriter //e goodies including NULL, shortline, and //c de-trashing patches, full microjustify and proportional space, complete and thorough disassembly script, sourcecode capturing details, self-prompting glossaries, answers to hundreds of most-asked questions, bunches more. Includes free "must have" bonus book and voice helpline support. Unlocked and unprotected. $39.95 from SYNERGETICS, Box 809-CST, Thatcher, AZ, 85552. VISA/MC. (602) 428-4073.

PRICE BUSTERS--Top-rated software, supplies and hardware at low, low prices. Send for **FREE** price list. See how much YOU can save! Tangent 270, 2509 Dahlia, Box 38587A, Denver, CO 80238, (303) 322-1262.

COMPLETE ADALAB PACKAGE by Interactive Microware, Inc. Includes interface card, 16 channel fast A/D convertor. Software includes Lab Data Manager, Vidichart, Quickersample, Stripcharter, Quick I/O, & AI13 Data Acquisition Module. All documentation included. Hardly used, like new. $880. Dennis Mercadel, 1151 Cheshire, Casper, WY 82609. (307) 235-4949.

TIRED OF ARCADE GAMES?—Hegira-Tale of a Galactic Exile, was developed by a professional programmer of large computers, who has also published science fiction stories. It is fun to play. So if you're tired of arcade games,try an S.F. adventure game. Send $17 to Ted Butler 12545 SE 270th St. Kent WA 98031. Wash. res. add 7.6% sales tax. Hegira requires a 48K Apple II, II+, or //e, with DOS 3.3.

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CHURCH MANAGEMENT PACKAGE—For Apple II, B.P.I. systems Church Management System includes tithing, general ledger, accounting payable and receivable, text editor for newsletter, mailing labels, member lists, etc. $400. includes back-up disks. System hardly used. Contact: Robert Tyson, 3111 4th St., Lewiston Idaho 83501, (208) 743-7353 for information.

APPLE PERIPHERALS AT BIG DISCOUNTS—Super ½ height drives—$195, Okidata 80—$185, BX 80—$295, Surge Protected Power Strip—$24.95, Disks—20 for $30, Joystick—$24.95. Many more items in stock. For more info contact NorthStar Communications at 2150 N. 107th St., Seattle, WA 98133 or call (206) 362-2288.

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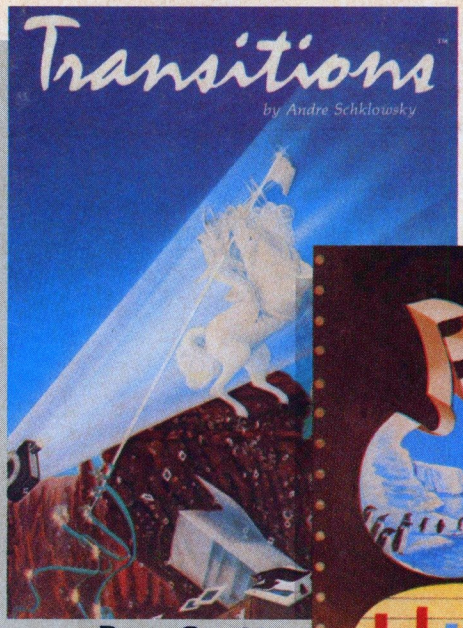

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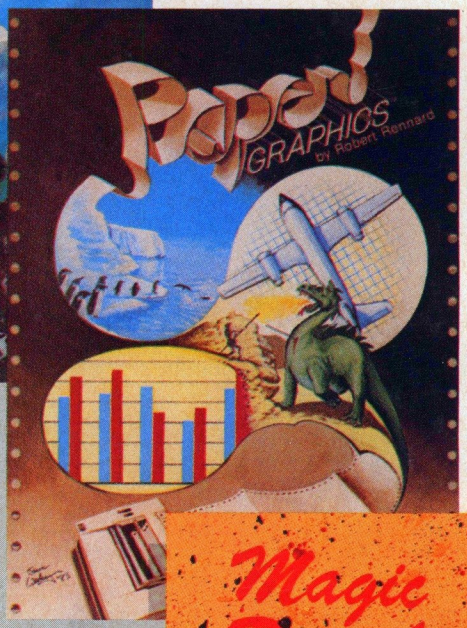

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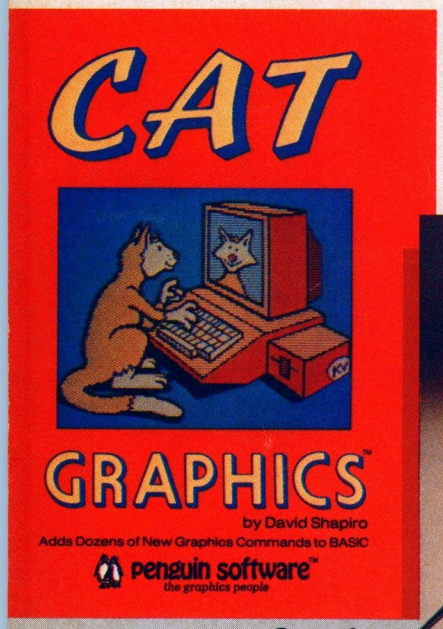

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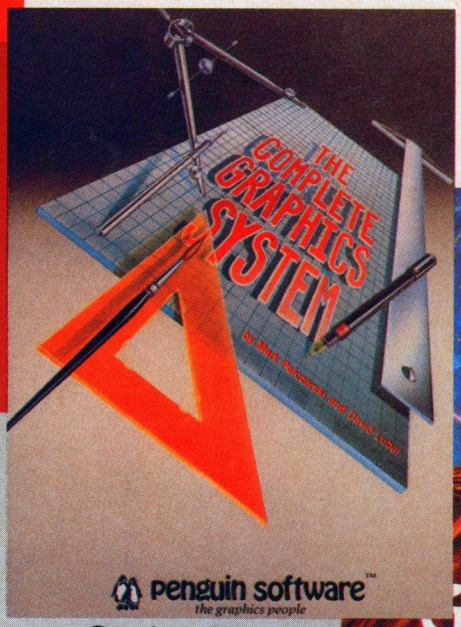

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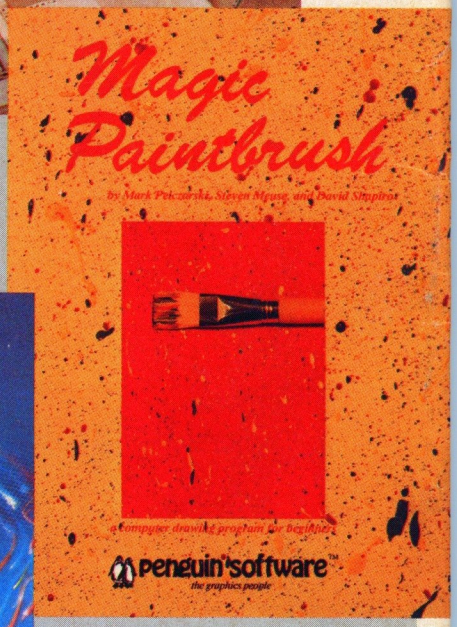

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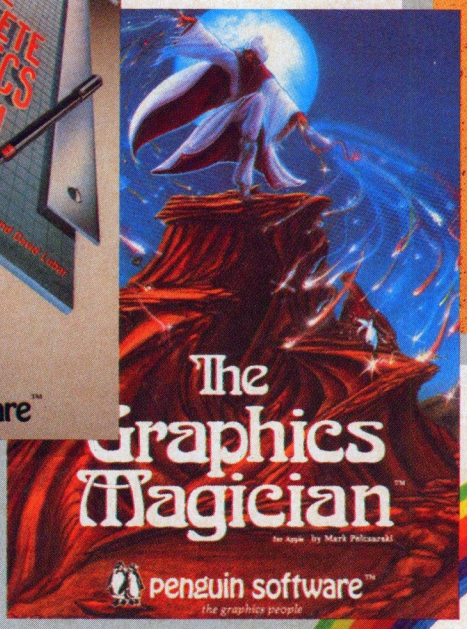

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